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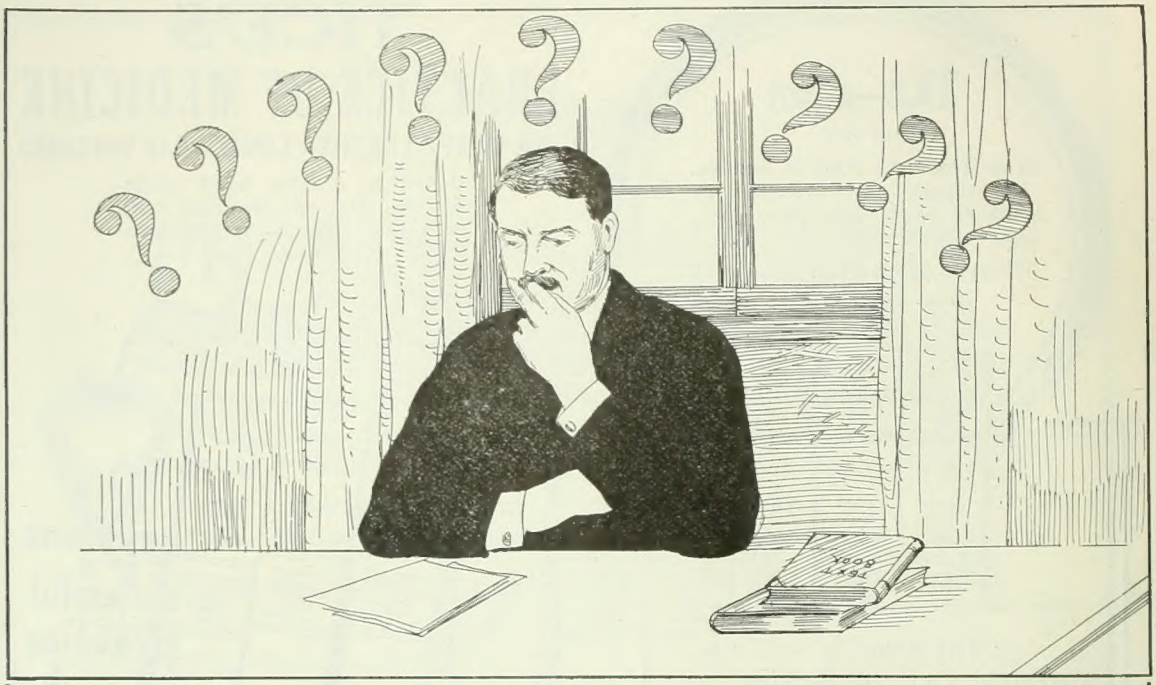

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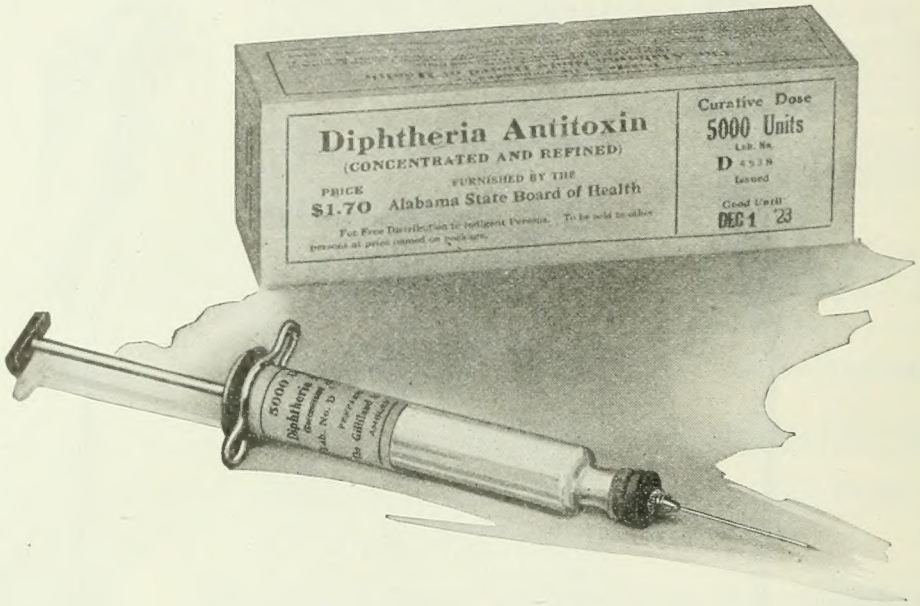

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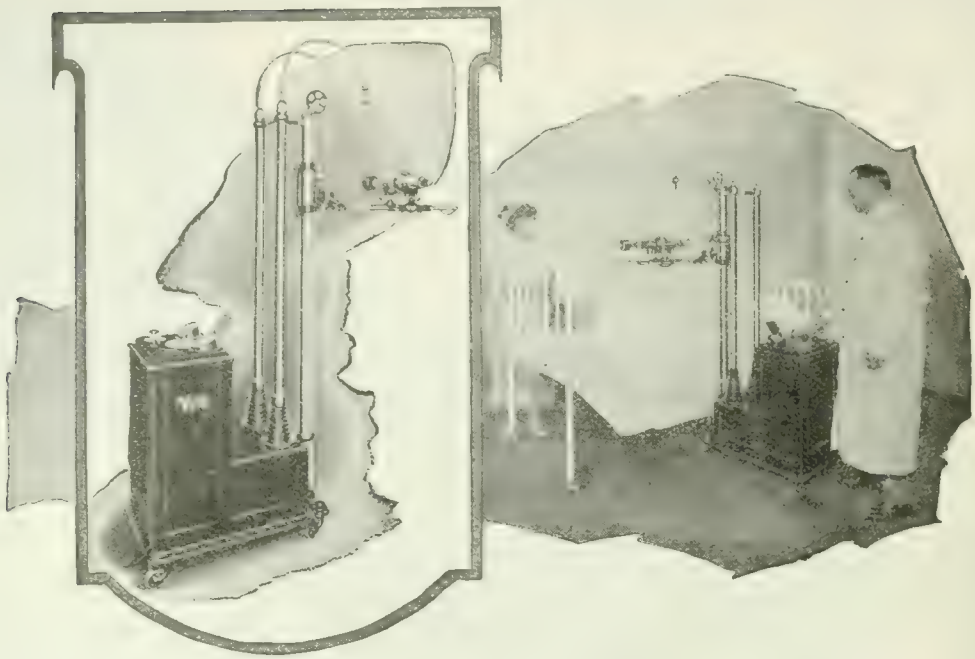

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Modern Treatment of Cancer of the Lip. Henry K. Pancoast, M. D., Philadelphia. *Surg., Gyn. and Ob., Vol. 34, No. 5, May, 1922.* Abst. in THE RADIUM THERAPIST, *Vol. 1, No. 7, July, 1922.*

Radium Emanations in Exophthalmic Goiter. Wallace I. Terry, M. D., San Francisco. *J. A. M. A., Vol. 79, No. 1, July 1, 1922.* Reprinted in THE RADIUM THERAPIST, *Vol. 1, No. 9, Sept., 1922.*

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Radium in Cancer of the Prostate A REPORT OF 217 CASES. Herman C. Bumpus Jr., M. D., Mayo Clinic, Rochester, Minn. *J. A. M. A., Vol. 78, p. 1374, May 6, 1922.*

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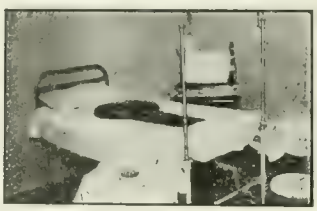

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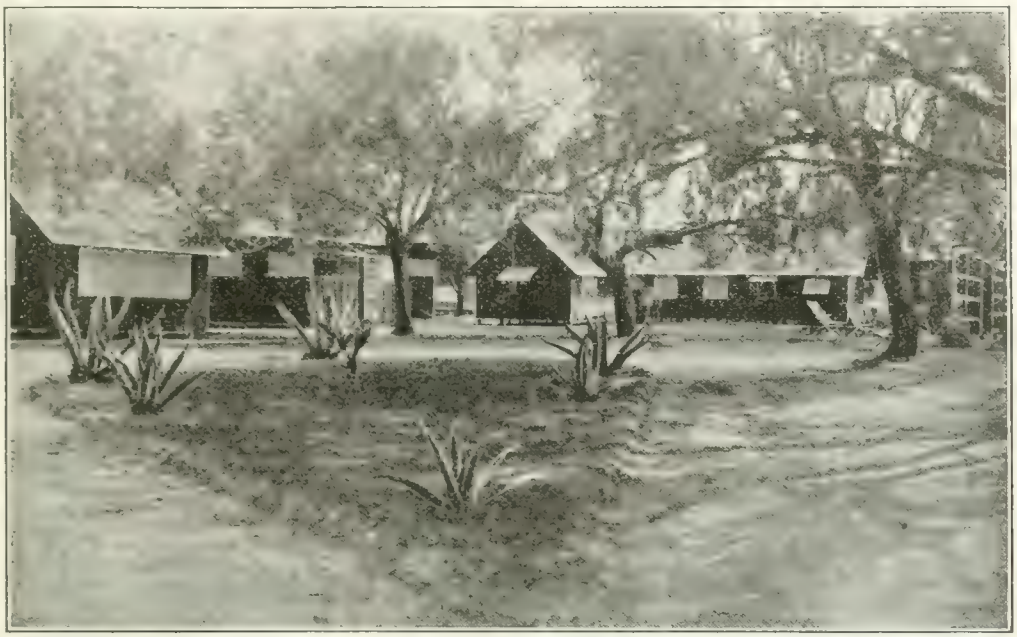

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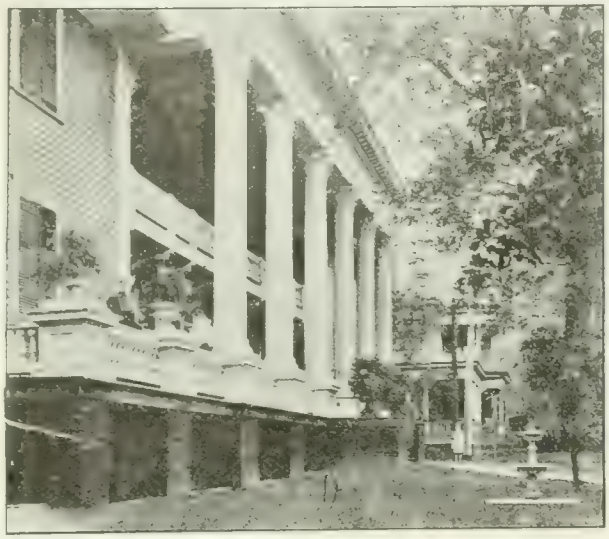

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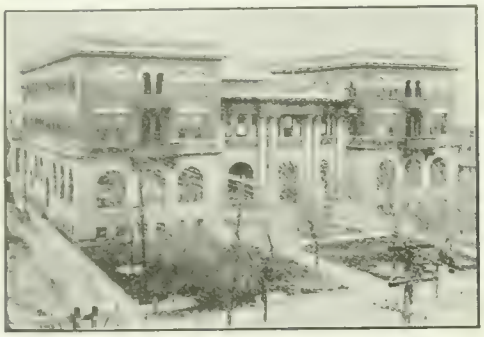

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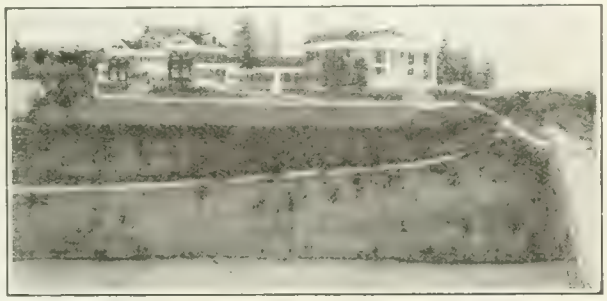

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MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

INFLUENCE OF POSTURE ON PHYSICAL SIGNS IN THE CHEST*

BY J. BIRNEY GUTHRIE, M.D.,
New Orleans, La.

A few observers have made note of what appears to be a paradoxical percussion-finding in the lungs in the lateral position, namely, a relative resonance in the side upon which the patient lies as compared with the upper or free side. Along with this there has also been noted an area in the region of the angle of the scapula of the uppermost side distinctly dull to percussion.

Tasker Howard[1] finds an area of dullness in the lateral position in that part of the chest immediately in contact with the table or bed and a circular area in the region of the scapular angle on the upper side. He quotes Conner and Dodge,[2] who were apparently the first to describe the phenomenon of hyperresonance in the dependent lung in the lateral position. Conner and Dodge apparently regard the circular area of dullness at the angle of the upper scapula as being only a contrast to the hyperresonant lung of the lower side. They use the expression "compressed side" as describing the lower lung.

Howard attempts to explain the resonance in what would appear to be the compressed lung by calling attention to a dorsal scoliosis with convexity downward existing because of the support of the trunk being largely from the shoulders and pelvis. This, says Howard, causes a spreading of the ribs which gives more room in the lower chest. And at the same time he believes that the ribs in the uppermost side are approximated more closely, which gives a lessened degree of resonance. The explanation certainly is inconsistent with compression. A compressed lung area would probably give dullness on percussion, not hyperresonance.

The writer observed the phenomena of dullness in the upper and resonance in the lower side in lateral posture repeatedly during the pneumonia experience in the winter of 1917-1918. He found the overlooking of this to have been a frequent source of error in diagnosis. The patient would be examined and an area of dullness at the base of the then uppermost lung pointed out as indicative of consolidation. On return to civilian practice the author undertook to find an explanation for this.

In approaching the problem as regards the lateral prone posture we must find a satisfactory reason for exaggerated resonance existing in the low-lying lung which is surely compressed from without by the weight of the body on the ribs, from within by the weight of the mediastinal contents moving by gravity to the lower side, and also by the drift of the diaphragm upward on the dependent side. It would seem that compression is prevented by some sort of mechanism within the lung itself which resists compression and ultimate complete collapse of the lower lung

*Read in Section on Medicine, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

area if continued for a prolonged period. A series of observations were made to determine the range of lateral displacement of the apex of the heart in the right and left lateral prone positions, respectively. This range of displacement was small in proportion to the weight of the heart and seemed to bear a relationship to the resistance of the lower lung to compression.

We are all familiar with the relative resonance of the base of the lungs as compared with the apices in the erect and dorsal decubitus posture. A series of children, 3 to 6 years of age, was taken and used for subjects. Strong assistants held the child and percussion was done at bases and apices of the lungs before and after the child was reversed from the erect to the head-down position. It was found that the bases of the lungs in the inverted posture became more dull as to resonance. This would not occasion much surprise considering the weight of the abdominal contents pushing upon the diaphragm and displacing it toward the head. However, the apices which in any upward drift of the diaphragm and diminution of the capacity of the thorax would also be compressed, became distinctly more resonant. This resonance extended to the third rib in front and to the scapular spine behind. Roentgen examination confirmed the percussion findings.

Adult subjects of light weight were suspended in horizontal position in slings so that the chest was to a very great extent free and the effect upon percussion findings of change from left lateral to right lateral posture was noted. No horizontal zone of dullness at the lowest portion of the low side could be noted. Relative hyperresonance as compared with the upper side always occurred. An interesting observation in this experiment was that this transfer of resonance did not occur when the breath was held and occurred during breathing only after three or four complete respirations had been carried out.

Medium sized dogs lent themselves very well to the test. It is a very simple matter to have an assistant hold the dog by his front or hind legs and alter the position of the animal. The observer, without displacing the fingers, can make the percussion. In the dog, percussion is so easy that it is not difficult to demonstrate even to the tyro in physical diagnosis the variation in resonance which I have described.

Norris and Landis[3] call attention to the necessity of using the erect posture if possible in examining the chest. They note "impairment of the percussion sound" in the side upon which the patient is lying with a "tympanitic quality." They have touched somewhat the truth when they say,

> "Slight dullness over one pulmonary apex which may be readily demonstrable when the patient sits up may disappear if percussion is performed in recumbency while the thorax rests on pillows or a soft mattress (resonators)."

This contrast we noted in a very marked degree in the dog as the result of changing from horizontal to a vertical posture. Norris and Landis have missed the truth in attributing the improvement in percussion resonance at the apices which they noted in the lying position, to resonance of the pillow or the mattress. It occurs in the dog as we let him down to horizontal position after having made the percussion in the erect posture. Here there is no question of resonators. Also in the human subjects used the apices were distinctly more resonant to percussion in the horizontal when compared with the vertical position. The phenomenon of Skodaic resonance is one we see every day. The usual explanation given is that the relaxation of the lung causes the hyperresonance or *tympany* as it is erroneously called. The assumed relaxation of the lung does not satisfy.

Various lung reflexes have been assumed. Some of these have been proved with a fair measure of satisfaction. Anaphylactic phenomena incidental to sensitization of guinea pigs and rabbits and subsequent injection of a foreign protein will produce emphysema in rabbits and guinea pigs. Some of us have seen asthmatic attacks come on after inhalation of irritant gases. The medical history of the gas warfare is full of case histories of emphysema brought on by inhalation of such irritants.

The existence of a more or less lasting contraction of the thoracic muscles incident to pulmonary or pleural inflammatory disease has been described and proven by numerous observers.

Perhaps the most interesting reflex from its bearing upon the subject of postural alterations of density in the lung is the so-called "reflex of dilatation" first described by Albert Abrams. This reflex is elicited by stroking the skin of the chest vigorously with a piece of flannel or a blackboard eraser. Abrams described a hyperresonance which occurred after this stimulation of the skin which is readily demonstrable to the percussing fingers. Neither Abrams nor any one else seems to have offered a satisfactory explanation of this reflex.

In the light of our observation that the increase in resonance at the apices is delayed until after several respirations are completed, we are justified in considering the possibility of a bronchiolar contraction which delays slightly the emptying of the vesicle, producing in consequence a vesicular dilatation. In every possible postural change we could devise, the lower portion of the lung was increased in resonance at the expense of the upper portion which became relatively dull.

These experiments also seem to throw a little light upon the subject of the etiology of massive collapse of the lung first described by Pearson-Irvine, in 1876, and later, in 1908, by W. Pasteur.[4] Sir John Rose Bradford[5] has written at length on this subject. The condition is what Pasteur describes as a total deflation of a large area of lung tissue in the absence of any lesion of the airway, or any known cause of compression. Pasteur regarded this condition as due to "failure of respiratory power." Bradford believes the cause to lie either in muscular inspiratory deficiency or bronchial obstruction.

Dingley and Elliott, 1914, quoted by Pasteur, take the view that the collapse is due to bronchiolar occlusion due to viscid secretion in the bronchioles. None of the few writers who have contributed to this subject offer a satisfactory explanation of the phenomenon of collapse.

In the postural experiments above mentioned it was found that a change of posture of any sort was accompanied by what seemed to be a vesicular dilatation of the dependent portion of the lungs and a relative increase in density in the uppermost lung or lung portion. A reflex origin of this phenomenon seems a justifiable hypothesis. The conclusion forces itself upon the writer that the lung collapse which has been noted following trauma elsewhere in the trunk is the result of a bronchiolar contraction. It would seem to be a severe and prolonged m u s c u l a r phenomenon which produces complete and spastic bronchiolar occlusion and perhaps the more or less massive collapse, as vesicular air is absorbed. If this hypothesis proves true, we shall have the same reflex mechanism capable of producing two very different results.

A moderate bronchiolar constriction impulse might cause moderate retention of air in the vesicle. A severe and prolonged bronchiolar constriction might shut off the vesicle from all air and result in complete collapse as the result of absorption of retained air from the vesicle.

The mechanism which brings about the diminished density in the lowest portion of the lung seems to be a bronchiolar constriction which acts like the intra-tracheal ball-valve of Harris and Chillingworth.[6] This allows air to come in readily, but prevents its easy egress. By this device Harris and Chillingworth produced emphysema in the animals under observation readily demonstrable at autopsy. The effect of the check-valve was to precipitate an attack of bronchial asthma with characteristic expiratory dyspnea. The emphysema may have been the result of the obstruction in the trachea itself or due to the bronchiolar contraction, which was indicated by the asthma. What is interesting from our point of view is the mechanism of vesicular dilatation which seems to be explained by their experiment. The alterations in the physical findings incident to changes of posture seem to point to some sort of retention of air in the vesicles of the lung which are lowest.

It is very striking how comparatively slight is the condensation of the posterior bases of the lungs due to compression in the prolonged dorsal supine posture. Extensive collapse of the lower parts of the lungs is the exception rather than the rule. Were it not for some mechanism which prevents this collapse, it would be a far more frequent occurrence than it is. We are familiar with the few evanescent crepitations which mark the extent of vesicu-

lar collapse in a patient in bed for weeks. A few long breaths and the crepitations have disappeared.

The writer is of the opinion that the phenomenon described is not the result of hypostatic vascular change. The increase in blood would be greatest in the low-lying portion of the lung and would tend to a dulling of the percussion note rather than an improvement. If we admit the ocurrence of a vesicular dilatation in the low-lying portion of the lung we should expect an increased capillary resistance in the low-lying portion, which would counteract any tendency to gravitation of blood toward the lowest level. Again we should have an influence protective in its operation.

In examining the back of the patient, who is lying on his side, the lower side of the chest, because of its compression, or, perhaps, because of its contact with the mattress, will give, almost always, a percussion note noticeably deeper and more resonant than that of the upper side. This contrast may be so marked that the upper will seem to lack resonance and be looked upon as abnormal.

Resistance to the examining finger on percussion also is subject to the same variation, and even the breathing sounds are often appreciably altered on the compressed side, there being a faint tubular element added to the vesicular sounds. These errors can best be avoided by having the patient sit up and lean forward. If the upright position cannot be used he should be examined first on one side and then on the other, or else examined lying flat upon his face.

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DISCUSSION

Dr. Lewis J. Moorman, Oklahoma City, Okla.—Dr. Guthrie's work may cause us to consider a restatement of our theories in regard to tuberculosis. Why is tuberculosis found most frequently in the apices of the lung, and why is it often intractable when found at the base of the lung? Perhaps a therapeutic suggestion from Dr. Guthrie's observation may be utilized in treating basal tuberculosis.

What influence has this phenomenon upon so-called hypostatic congestion and pulmonary edema in cardiac conditions?

All of us who study chest conditions have appreciated the more outstanding phenomenon which Dr. Guthrie has mentioned, the hyperresonance occurring on the dependent side. This phenomenon is interesting in connection with Dr. Webb's observation with reference to the fact that the longer a patient lies in one position the less penetration there is on the dependent side and the narrower the interspaces when the patient is exposed to the x-ray.

Dr. Charles L. Minor, Asheville, N. C.—We all know that the findings in recumbent and erect patients vary; and we have all found how unsatisfactory is the examination of a patient recumbent in bed. Few of us will be able to examine our patients in the unusual posture which Dr. Guthrie uses. We have much interesting apparatus in our offices these days, but the public would gasp if it included a block and tackle to hang our patients up by their feet.

Dr. Guthrie (closing).—The best subject upon which to demonstrate this apparently paradoxical change of percussion note is a medium sized dog. You can lift the dog by the hind legs. An assistant can hold him up by the hind legs and you can reverse the position very easily. You can study the signs in a horizontal position. You can raise him up to an erect posture on the reverse at will, percussing the fingers in place as his posture is altered. It is easy to see a difference in the percussion note in the different positions of the dog.

THE MURMUR OF MITRAL STENOSIS IN THE PRESENCE OF AURICULAR FIBRILLATION*

By Neuton S. Stern, M.D.,
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The murmur of mitral stenosis and the effect upon it of the condition known as auricular fibrillation is easily understood if it is approached from the point of view of physiology. The mechanism of the murmur in the regular heart can be studied and then the changes made in the

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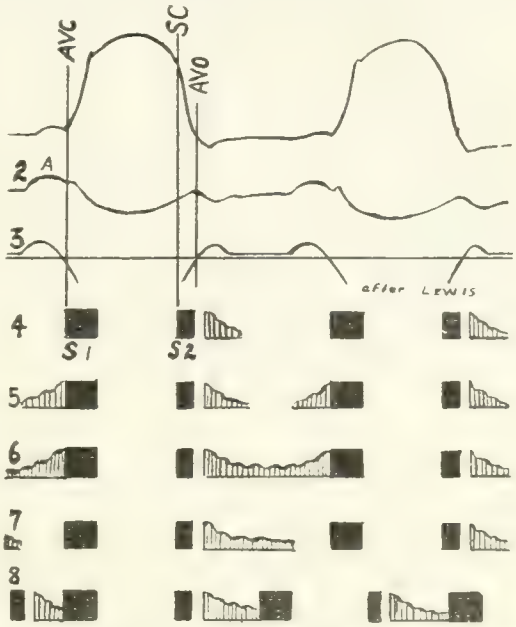
murmur by the addition of the new element, fibrillation.

The top curve in the diagram (Fig. 1, curve 1) represents the changes in the pressure inside the left ventricle. At the first line marked *AVC*, ventricular systole begins with the closing of the auriculo-ventricular or mitral valve. The pressure rises and is sustained throughout contraction. When relaxation sets in the pressure falls. When it falls below the pressure in the aorta, the semilunar valves close (marked *SC*) and the snapping closure of these valves produces the second heart sound. The pressure continues to fall, until finally it is below the level of the pressure in the auricles. At this point the mitral or *AV* valve opens, and the blood begins to rush from the auricles into the ventricles. The mitral valve remains open then throughout diastole. There is a distinct interval between the closing of the semilunar valves, i. e., the second sound, and the opening of the *A-V* valves. This time interval averages, according to Lewis, 0.06 second.

The pressure changes in the auricle (Fig. 1, curve 2) are much less marked than in the ventricle because there is much less work to be done, and the muscle contraction is, therefore, not so strong. At the point marked *A* there is a rise in pressure. This is due to the contraction of the auricle, which precedes the ventricular contraction. The general curve of pressure then falls off because the auricle is relaxing and dilating, but soon blood which flows in steadily from the great veins puts it under gradually increasing but slight tension. This pressure mounts until the *A-V* valves open, and the blood then rushes into the relaxed ventricle. As the ventricle fills, the inflow becomes slower and slower, until at the end of diastole it is hastened again by the next auricular contraction.

If these two curves are studied together it is found that only during diastole is the auricular pressure greater than the ventricular pressure. During this time only is the mitral valve open. It is also to be observed that during this diastole the difference twice becomes accentuated (Fig. 1, curve 3), first, at the time of the onrush of blood just after the opening of the mitral valve, and second, during the auricular systole. During these periods the blood flow is increased in rapidity.

These pressure differences hold good whether the mitral valve is normal or stenosed. When the valve is normal and the leaflets are smooth, they open freely and the blood passes over them without any sound. As mitral stenosis sets in, with its roughening of the valves and its constriction of the orifice, the blood begins to meet obstruction in getting through. Naturally it is checked more during the periods of rapid flow, that is, at the two points mentioned above. The



The murmur of mitral stenosis. *AVC*, closing of auriculo-ventricular valves. *SC*, closing of semilunar valves. *AVO*, opening of *a-v* valves. *A*, auricular contraction. *S1*, first heart sound. *S2*, second sound. The solid blocks represent the heart sounds, the shaded areas the murmur. 1. Intra-ventricular pressure curve. 2. Intra-auricular pressure curve. 3. Constructed curve, auricular pressure minus ventricular pressure. 4. Early diastolic murmur. 5. Early diastolic murmur with presystolic murmur. 6. Developed mitral stenosis, prolonged diastolic murmur with presystolic accentuation. 7. Auricular fibrillation, long diastoles. 8. Auricular fibrillation, short diastoles.

action and reaction between blood and valves sets up vibrations in the leaflets and the blood column, and the vibrations become evident to our ears as a rough or rumbling murmur.

At the period of rapid blood flow just after the opening of the *A-V* valves, a murmur is thus produced. Here the importance of the interval between the semilunar closing and the *A-V* opening becomes apparent. The diastolic murmur (Fig. 1,

curve 4) following closely upon the *A-V* opening is separated by a similar interval from the second sound due to the semilunar closing. The interval is distinct, and can readily be detected by the ear. This relationship between the second sound and the murmur is a constant one. The double sound, i. e., sound and murmur, is best heard at the apex or at the fourth interspace or rib just to the left of the sternum. It is heard more plainly when the patient lies down.

Two points distinguish this diastolic murmur from the diastolic murmur of aortic regurgitation. The first is that the interval is usually, though not always, present in mitral stenosis. The second is the quality. In stenosis it is usually rougher and more rumbling.

At the second period of increased pressure difference, a murmur may likewise be produced. This is during the auricular contraction, or in ventricular presystole. It is the opinion of the best authorities that the presystolic murmur is only rarely heard alone, though the early diastolic is often so heard. This presystolic murmur in the earlier stages of stenosis may be separated from the early diastolic (curve 5).

In the later stages with increasing obstruction the diastolic murmur becomes louder and more prolonged, eventually joining with the presystolic. Under these circumstances there is a long diastolic murmur beginning at a short but definite interval after the second sound and continuing with presystolic accentuation up to the first sound of the next heart cycle. This is the characteristic fully-developed murmur of well-marked mitral stenosis in a regularly beating heart (curve 6).

The changes in this characteristic murmur induced by auricular fibrillation will depend upon the changes of mechanism coming in with the new condition. Two changes in mechanism are important here. The first of these is the loss of auricular function. The auricle no longer contracts as a whole, but it stays endlessly in the relaxed diastolic position. The second change is that there develops a complete irregularity in the contractions of the ventricle. The beats follow each other in disorderly sequence. This means that the periods of diastole between beats constantly vary, some being long, some being short.

If the auricle no longer contracts, any phenomenon caused by its contraction of course ceases. In the normally-beating heart the auricular contraction causes, as we have seen, the presystolic accentuation of the mitral murmur. Therefore, in auricular fibrillation with a continuously relaxed auricle, this presystolic accentuation will cease to occur. In the long pauses the presystolic period may be and often is represented by a quiet interval (curve 7).

The second change that occurs during auricular fibrillation is the complete irregularity of the ventricular contractions. The time consumed for each systole remains constant. Therefore, the irregularity must be at the expense of diastole. Hence, some diastoles are long; some are short. Now if the diastole is long, the diastolic murmur, which commences a short definite period after the second sound, will be present as usual, gradually fading out as the ventricle fills. With the auricle quiescent, this murmur is followed by the presystolic silence; and then comes the first sound of the next cycle. If on the other hand the diastole is short, the diastolic murmur starts as usual; but before the ventricular filling is complete and the murmur ended, the first sound of the next cycle is heard (curve 8). In the long diastole, therefore, the murmur is followed by a pause; in the short diastole it is not followed by a pause. Thus the murmur does not bear constant relationship to the subsequent first sound, but to the preceding second sound.

The long and short diastoles are mixed haphazardly in auricular fibrillation. When the heart is beating rapidly the short diastoles predominate. In the slowly-beating heart the long predominate. When fibrillation is present, the points of diagnostic importance are: First, the diastolic murmur is almost always separated from the second sound by a definite but brief interval; second, there is the silent presystolic period in the long diastoles; and third, there is the rough and rumbling quality of the murmur.

SUMMARY

(1) There is a definite period of time in the heart cycle between the closing of the

semilunar valves and the opening of the auriculo-ventricular valves.

(2) There is a similar interval of time between sounds corresponding to these events, i. e., the second heart sound and the diastolic murmur of mitral stenosis.

(3) This interval when present is characteristic of mitral stenosis.

(4) The diastolic murmur extends more or less throughout diastole depending upon the stage of stenosis.

(5) There may be a presystolic murmur, or presystolic accentuation of the diastolic murmur when the auricles beat normally.

(6) In auricular fibrillation, the presystolic element is lost, and in the long pauses is replaced by a silent period.

(7) In auricular fibrillation, the diastolic murmur may fade out and be succeeded by silence, or may continue into the following first sound, depending upon the length of diastole.

(8) In auricular fibrillation, the constant interval between the second sound and the diastolic murmur persists.

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DISCUSSION

Dr. G. Canby Robinson, Baltimore, Md.—The murmur of mitral stenosis is a murmur of great variability, a fact which was impressed upon me in my interne days when I followed a case of typhoid fever. I examined the heart frequently, having no suspicion of a mitral lesion, but discovered characteristic signs of mitral stenosis just before the patient was to leave the hospital. After she had been up and about the hospital ward for ten days there suddenly appeared a loud presystolic murmur at the apex, with a definite thrill and all the cardinal signs of mitral stenosis. These signs were not discovered while the patient was ill with typhoid fever and recumbent.

The moral of this case seems to be this: the murmur of mitral stenosis is dependent upon the relation of the degree of stenosis and the velocity with which the blood passes through the narrow mitral orifice. In the case cited, the velocity of blood flow was not sufficient to produce the signs of stenosis until the patient was up and about. That is borne out in Dr. Stern's diagram showing that at the points where the velocity of the blood flow from auricle to ventricle is greatest the murmur is heard. Dr. Stern is correct in saying that the earliest time of mitral stenosis is a short diastolic occurring early in diastole. It is not nearly so easily recognized, but with slight valve changes the diastolic murmur is the first murmur that can be heard in mitral stenosis. In the later stages, when the heart is beating more violently and the velocity is increased, the murmur will become prolonged and finally will be continuous. The degree of stenosis will have an influence upon the heart on account of the fact that when the stenosis is great the velocity must be maintained relatively high throughout diastole to get the required amount of blood through from the auricle to the ventricle. This whole scheme is upset when we no longer have the auricular contraction which increases the velocity of blood at the end of diastole, as we have when the auricles are fibrillating. Then the diastolic murmur fades away, like the diastolic murmur of aortic insufficiency. This fact is of considerable importance.

You may remember that a number of years ago there was a good deal of discussion as to the cause of the presystolic murmur in mitral stenosis, whether it was due to auricular contraction or not. It was found that the presystolic accentuation of the murmur disappeared with the onset of auricular fibrillation, and it was stated that the auricular systole was responsible for the accentuation. A recognition of the fact that the intensity of the murmur is dependent upon the velocity of the blood in relation to the degree of narrowing gives one a clearer understanding of this matter of the murmur of mitral stenosis, and it emphasizes the point that the murmur is not only presystolic, but is diastolic as well.

Dr. Randolph Lyons, New Orleans, La.—In a certain proportion of cases of mitral stenosis where fibrillation is quite marked, it has been my experience to find it difficult to hear any murmur, and sometimes we have to make a diagnosis by the snapping quality of the first sound.

Dr. Stern (closing).—This murmur can be elicited under test conditions when it is not heard during the ordinary routine examination. If you suspect the presence of a murmur of mitral stenosis, it is not suffiicient to examine the patient in the erect position. He must be examined in the recumbent position. He sometimes then will present this diastolic murmur. If not, and if you still suspect it from the history and so on, it is advisable to test him by exercise. This can be done by hops or dumb-bells or any other form of exercise which will cause the heart to beat more violently. If that fails, it is possible at times to produce the murmur by the inhalation of amyl nitrite.

FAT INTOLERANCE*

By Philip F. Barbour, M.D.,
Louisville, Ky.

All practitioners will meet from time to time with children who have difficulty in handling fats in their food. Sometimes it is easy to recognize the association between the intake of fats and the resulting discomfort, as in the vomiting of young babies on a diet too rich in fats. In such cases there seems to be an almost imme-

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diate response to the impact of the fat. It is difficult to prove that there is any local sensitiveness to fats *per se* in the gastric mucosa; and yet clinical evidence points in that direction.

Again, there are cases in which the connection between the ingestion of fat and the symptom will be far more obscure, when the fault seems to be physiologic and there is a disarrangement of the inner metabolism of the fats. The disturbance may be chronic and persistent, of which eczema may be considered a type at times; or there may be an accumulation of by-products finally resulting in an explosion, so to speak, of which cyclic vomiting may be taken as a type. The facts are fairly well accepted, the theories and hypotheses to explain these facts are still *sub judice* and offer a fertile field for investigation and research. This will require much effort and in the meantime discussion and suggestion will help clarify our minds and perhaps delimit the field to be investigated.

Fat intolerance and fat indigestion are not quite synonymous terms, though they may coexist. Fat intolerance implies a certain disproportionate reaction to fats whether they are digested or not. In babies, for instance, it causes vomiting when there is even less than a normal percentage of fat present in the food.

In young infants vomiting is one of the early and suggestive symptoms. It normally occurs more than an hour after feeding and is an exaggeration of the back-kick that follows the taking of cod liver or castor oil of which adults so frequently complain. But it may occur at any time after nursing and persist even into the next feeding and is often projectile and the vomitus shows fatty material. After a varying length of time mucus begins to appear in the vomitus and will continue for a long period.

The stools show fat in various forms from soaps through fatty acids to the neutral fats themselves. There is a gradual loss of weight which gains impetus, the emaciation and prostration become extreme and acidotic symptoms may close the story.

Many of these cases simulate pyloric stricture and spasm, but the urine will not be so reduced in quantity and stools will be passed containing partially changed fats instead of the dark green starvation stools found in pyloric disturbances. Peristaltic waves are not so much in evidence nor will the characteristic tumor be palpated. Pyloric obstruction approaches a climax about the sixth week, but fat intolerance may begin much earlier or later. The x-ray is not always to be relied upon for the shadow may persist for twenty-four hours and yet there be no real stenosis. The duodenal tube as suggested by Hess is an admirable diagnostic help and when used in conjunction with the x-ray should be absolutely determinative for or against stenosis of the pylorus.

There seems to be a spasmophilic tendency in the muscles of the stomach and the intestine in these cases which may forcibly eject the contents of the stomach or may likewise increase the intestinal peristalsis. These spasms cause pain and the baby is restless and uncomfortable whether vomiting or not and will cry out and squirm and balloon-up from gas. They are vago-tonics. Their sleeplessness, restlessness and evident discomfort react upon the mothers to make the milk secretion less normal. Too frequently both mother and child appear to be confirmed neurotics.

When mucus is found frequently and abundantly in the vomitus it is a debatable question whether the vomiting is due to the irritable if not inflamed mucosa of the stomach or to fat intolerance. The history here should show whether the vomiting had long preceded the evidence of stomach irritation. When much mucus is present it will be necessary to address medication to meet this added factor.

Before discussing the treatment it will be profitable to refresh our knowledge of the physiologic chemistry of the fats. Cow's milk contains many more of the lower volatile fatty acids not found in mother's milk. However, fat intolerance may occur with mother's milk, so that those lower fatty acids are not the principal factors though they do play a part. The fatty acids are combined with a glycerol base and are saturated compounds except the olein. The fats are not digested in the stomach unless very finely emulsified, in which case the natural lipase will break up some of the fat. This may ex-

plain the fact that milk, warm and fresh from the cow is apparently more easily digested by the baby than that which has separated. This may obtain also with mother's milk. Whether digested or not fat has a very noticeable influence in retarding digestion and lengthening the time that food is retained in the stomach. A practical corollary is that skimmed milk mixtures may be fed at somewhat shorter intervals between feedings.

The fats are decomposed in the intestinal canal into the corresponding fatty acids and glycerol. They combine with the bases present to make either the soluble sodium or potassium soaps or the insoluble calcium and magnesium soaps which in some measure will be found in the stools and in cases of fat indigestion will form large and noticeable curds simulating casein curds. As the saponified fats pass by the intestinal villi they are taken up by the epithelial cells, resynthesized in some obscure way with glycerol and formed again into natural fats to be collected by the lacteals and carried to the blood stream through the long thoracic duct. The emulsification and saponification of the fats depends upon the intestinal and pancreatic secretions, but the absorption is very largely controlled by the presence of normal bile. The proper functioning of the liver is absolutely necessary and important to the young baby with intolerance or indigestion. It is probably even more vital in the older children whose intolerance seems to spring from a faulty inner metabolism.

The treatment of fat intolerance in babies requires a marked diminution in the amount of fat taken in the food. With bottle-fed infants this can be done quite easily by using skimmed milk, which contains only about 0.5 per cent of fat. In breast-fed babies the mother's diet should be sharply reduced and vigorous exercise required; or if there is an abundant secretion of milk, it may be pumped and the cream skimmed after several hours. Of course, the caloric value of the food is greatly reduced and it will become necessary to increase the skimmed milk as rapidly as it can be digested and also carbohydrates should be added to tolerance. Sometimes the sugars become offenders also, in which case cereal gruels or baked flour itself may be added and the thickening of the food often aids in correcting the vomiting. It is necessary to figure the calories quite accurately in these cases, otherwise there will be a slow starvation.

When the capacity for digestion of the proteins and carbohydrates has been ascertained an effort should be made to increase the tolerance and digestion of fats. The cream should be added in very small amounts and at sufficiently long intervals, because the disproportionate amount of protein and carbohydrate may set up other types of alimentary disturbances. Also, the limit of the stomach capacity makes it difficult to provide sufficient caloric value without the addition of fat. Again, the fats are the main source of the fat-soluble vitamins, whose value is hard to overestimate, as they affect the nutrition or influence the resistance to infections. It must be noted here, however, that von Pirquet has asserted that during the privations of the war he has secured good physical growth and resistance to infection by a diet containing practically no fats.

The following quotation is of interest:

"Fat, in von Pirquet's opinion, is not a fundamentally essential article of diet, except as a requisite in cooking technic. It is purely a fuel food with a high value per unit volume, elaborated by Nature for the sake of compactness. It can be replaced entirely by carbohydrates without harm to the organism. * * * * * * It has often been pointed out that while there is no fat minimum, the exclusion of fat would withdraw substances (lipoids, vitamins) which are important to life. Von Pirquet could see nothing in practice which really corresponded with this theoretical consideration. The objection is at present still a theoretical one, but certainly requires proof, and the following remarkable experiment is recorded: the attempt was continuously successful to feed infants from birth for months (the experiment lasted about twelve months) with centrifugalized skim milk, without demonstrable disturbance in a child which could in the slightest degree be related to the food. The fat was replaced by equivalent amounts of cane sugar. Even as regards the lessening of immunity to infectious disease there was nothing to be noted."*

These theories need not necessarily be accepted even when backed by such an authority as von Pirquet. However, they must be taken into consideration in any discussion of infant feeding.

*Von Pirquet: American Journal of Diseases of Children, June, 1920.

The fat values may be substituted by olive or cod liver oil in many cases that have difficulty in handling the fats of milk. They each contain unsaturated carbon atoms and have a high iodin saturation which favor their digestion and assimilation and also the inner metabolism.

The medicinal treatment is helpful. The acidity can be counteracted by the administration of alkalis such as magnesium hydroxid, sodium bicarbonate or liquor calcis, but there are several observers who claim that alkalization may easily be overdone, especially with regard to the digestion of the other food elements. When there is much acidity to the vomitus there will also be mucus from the irritation of the mucosa of the stomach. Washing the stomach with a mild alkali and the after-administration of a bismuth mixture will be indicated. Gavage is more helpful in cases of chronic vomiting not due to fat intolerance. Antispasmodics are helpful in vagotonic cases. Belladonna should be pushed till its physiological effect is produced, but the value of bromids, valerian, and other such agents should not be overlooked.

Nature has a very admirable mechanism for preserving equilibrium between food intake and outgo. The nitrogen balance and its preservation is well understood. Fats also are nicely balanced in the normal child. Fats burn up in the fire of the carbohydrates. If the fats are not eaten in sufficient quantity or are of a variety that is not adapted to the human economy, the carbohydrates can be utilized and in fact synthesized into fat, and the protein also to some extent is converted into fat, though physiologists and our own experience would show that such converted fats do not furnish the reserve that comes from the normal fats.

Excessive quantities of fat tax the digestion, retard the emptying time of the stomach and in this way lessen appetite, so that less food will be eaten thus reducing the likelihood of overfeeding.

Fat is stored up in the great fat depots of the body, the abdominal cavity, mesentery, under the skin, etc., in the liver and in the tissue. Excess of fat may be found in one or other of these places or it may undergo partial combustion or splitting into fatty acids. In order to neutralize these acids protein breaks down and furnishes ammonia so that the urine has a largely increased ammonia output and odor. The capacity to handle this excess fat varies with the individual and it is believed that this capacity is low in the children that suffer from eczema facialis. A sharp reduction in the fat intake will often cure an intractable eczema, though one must not forget that eczema may also be due to protein sensitization.

The fat in the fat depots is a very stable saturated compound. In order to be changed to tissue fat it must undergo chemical changes which apparently are effected by the liver as the liver fat is between the other two in chemical constitution. The most plausible hypothesis is that the liver has an internal secretion which has the property of mobilizing the fats.

Cyclic vomiting is not always due to fat intolerance. McGuire Newton, before this Section at Asheville, showed how chronic appendicitis may cause recurrent vomiting. But clinical experience has shown that most cases of cyclic vomiting can be cured by eliminating fats in the diet for a considerable period of time.

Morhtan postulates that acidosis leading to ketonuria is the result of the fatty acids pursuing an abnormal path of metabolism possibly as a result of overwork of the liver (J. A. M. A., Vol. LXV, p. 2245).

How often an attack of cyclic vomiting has been checkmated by a good mercurial given in time! The essayist has relied greatly upon long-continued administration of sodium phosphate to ameliorate such cases.

Rotch has called attention to the necessity of reducing the fats to as low as 0.5 per cent in the treatment of marasmus, to be increased very slowly. All of us have learned by experience that the feeding after severe diarrhea must be low in fats for quite a time. The toxins of enteritis and colitis do affect the functions of the liver in many ways.

There seems, then, to be a disturbance of function of the liver in most of these cases. These functions are more numerous and varied than is the case with any other

organ. Every effort should be made to lighten the burden of the liver. A toxic intestinal tract through the portal system puts additional work upon cells which are laboring. If the energy of an hepatic cell has to be taxed to destroy toxins from the intestinal tract there is less capacity left to attend to its other duties. Certainly its internal secretion must suffer and the mobilization of fat affected. We do not know what agents control that internal secretion, but the laws of physiology and dietetics can guide us until our knowledge is more exact and complete.

It should be noted that fat intolerance tends to disappear during second dentition. In the readjustment of the constitution at that time there are many things to be rationally explained of which this is one.

These various phenomena and theories have been propounded with the hope that the combined wisdom, experience and technical skill of this Section may work out an adequate scientific explanation of a problem which has not as yet been solved.

DISCUSSION

Dr. J. Ross Snyder, Birmingham, Ala.—That grand old man of pediatrics, Abraham Jacobi, would have been delighted to hear this paper and discuss it. For over sixty years he talked of the dangers of fats in infant feeding. He taught that top milk feeding was not good and tried to show the danger of it.

Speaking of fat intolerance, we must consider this fact: usually fat intolerance is acquired only after the infant has been fed a long time on food which contains too much fat for that individual child. I doubt whether there is such a thing as a real fat intolerance. I have never encountered it. I have, however, seen many infants who have had fat indigestion after they had been fed on food not suited to that individual. The permissible quantity of fat varies not only with the individual, but it varies geographically. Children in Alaska and Canada and even in the New England states can digest considerably more fats than can the children of the temperate zones and the Southern states. We ought to take that into consideration in feeding these infants. This is the reason, to my mind, that we find buttermilk and dry milk in common use in the South. Many children will thrive on that who will not thrive on cow's milk unless it is skimmed. I think we ought to take these facts into consideration.

Dr. W. W. Harper, Selma, Ala.—In the summer of 1920 the chemist of the Floating Hospital, Boston, did some work on fats and I believe the results have since been published. He thought he could obtain a milk easier of digestion by using olive oil in the place of cream. It was tried out, but the babies did not thrive. Then he began to work from the chemical standpoint and found there was something in animal fat that was not in vegetable fat and that substance was a vitamin. The babies did not begin to improve until he added a certain percentage of cream.

I cannot accept the views of the men who believe that percentage feeding is a thing of the past. I believe the bulk of infants will get along with any kind of feeding. To prove that, you would only have to live in my neighborhood, where almost from birth the negro children are fed almost anything and still live. Of course, we have infant mortality. I believe that while we should not feed absolutely according to the calories, we must know something about calories in order to approximate the caloric requirement of the baby. I want to cite a case of marked fat intolerance.

This was the grandchild of a physician who was very proud of the boy, as he was the only one in the family. When I saw the child he was the color of a Chinese and the parents thought he was going to die. The case had been diagnosed chronic malaria. Quinin had been given vigorously but the patient grew steadily worse. I found the stools to be almost pure soap. In order to make this baby gain in weight the parents had been feeding cream freely. Instead of gaining in weight the baby lost. The treatment was a skimmed milk diet. The recovery was prompt.

Dr. W. McKim Marriott, St. Louis, Mo.—Fat intolerance is a condition which is seen rather commonly in infants fed according to the percentage method when top milk mixtures are used. It is rare in infants fed on whole milk formula such as we use.

There is one form of digestive insufficiency in which fats are very poorly utilized and which is not always the result of over-feeding of fats. This clinical entity has been described under the name of celiac disease by Gee, Still and other English authors. In the text book of Holt and Howland it is classed as chronic intestinal indigestion. Children suffering from this condition fail to gain weight, become pale, have prominent abdomens and pass stools which consist almost entirely of soaps. The very fact that a stool consists chiefly of soaps is not in itself of very much significance because the stool might as well consist of this as anything else, but the stools of these children are very large in volume and the stools of a single day may contain a number of ounces of soaps, and that is of significance.

We have in the hospital at present a typical example of this condition. From 80 to 90 per cent of the fat ingested reappears in the stools in the form of soaps. In the presence of this almost complete inability to absorb fat it is both useless and harmful to continue to feed fat. These children can take also very little sugar, although starch may be taken in moderate amounts. For these reasons the diet must consist largely of protein. As the basis of the diet for such children we use the curds from skimmed milk or the convenient dried calcium caseinate. An infant, during the second year, may take as much as 3 ounces of calcium caseinate or the curds from 3

quarts of skimmed milk. These curds may be ground up into a quart of skimmed lactic acid milk (buttermilk). Lactic acid milk is used because the tolerance for it is much higher than for sweet milk. Such a mixture is still low in calories and this deficit may be made up to some extent by the addition of baked potato or cereal to the diet. Rare scraped beef may also be added. In this way the caloric requirement may be met. The diet, however, is lacking in the fat soluble "A" vitamin and without this proper growth will not occur and rickets may develop. Cod liver oil contains much more of this vitamin than does butter fat, so that a small amount of cod liver oil (one or two teaspoonsful daily) is added. A convenient method of adding this is to grind it up with the casein or milk curds. This amount of cod liver oil is fairly well absorbed and does not cause digestive difficulties. A small amount of powdered spinach boiled up and added to the feeding is a great advantage in supplying the necessary iron and pigment matter. Such a diet as outlined is an adequate one and is well assimilated by children suffering from inability to utilize fat. This diet may be continued for many months.

Dr. Fritz B. Talbot, Boston, Mass.—I agree with Dr. Marriott in so many things that I hate to disagree with him in this one respect, but I think that it does make a difference whether there is a lot of fat in the stools of some children. There are a few children over two years of age in whom the examination of the stools under the microscope shows a large excess of fat, and in these children withdrawal of the excessive amounts of fat from the diet results in cure of the symptoms.

Frequently it is not necessary to look at the stool under the microscope to see whether it contains an excess of fat. I think Dr. Marriott will agree that it does not make any difference if you find some soap in the stools under the microscope, but it does make a difference whether the total amount of fat in the stool is in great excess. You take part of a stool and put it under the microscope and see some fat. That does not mean anything if the stool is small, but it does make a difference if there is a quart of stool.

One other point I should like to emphasize. That is the relation of the body mechanics to the digestion of fat. Both by observing the bulk of the stool and by microscopic examination of the stool it has been shown on repeated occasions that where body mechanics are poor and there is marked ptosis and the belly sticks out below the navel more than it does above, you will find more fat than is normal in the stools under the microscope and a bulkier stool than normal. The excess of fat in the stool disappears when the body mechanics are corrected. That is not the whole of the evidence. The evidence goes farther in that when these children are in this tired, ptosed position they do not do well, as Dr. Barbour said, unless they are on a diet with a diminished amount of fat. Correct their posture and they usually will be able to take the same amount of food as a normal child.

Dr. L. B. Clarke, Atlanta, Ga.—Dr. Snyder struck the keynote: the situation in Georgia, Alabama and North Carolina is different from that in the colder climates. It is a question of geography. We cannot feed our babies top milk. If these gentlemen who teach feeding in the East and advocate the use of top cream altogether in formula work were down in any part of Georgia or Alabama they would go out of business in a very short time in spite of excellent reputations in the East. There are very few babies under six months of age who can take anything like whole milk. There are very few who can take it under nine or ten months.

Dr. Marriott said he had not had fat intolerance. I have had it commonly. It has been rather the rule than the exception. I have fed any number of babies on skimmed milk up to four months of age and sometimes six or seven months. I can recall cases in which I fed it until one year of age. The babies were one year old before they could tolerate fat. They were fed practically fat-free milk.

I was very much interested in that allusion to geography because I have thought for years that babies in Greenland, Iceland, San Francisco, Fiji Islands, and in the South of the United States were entirely different babies. The Greenlanders and the Eskimos feed blubber to their babies from birth, but our babies could not take it. This is a question that has been lost sight of generally outside the South. It is a question that has been lost sight of in the text books, namely, that the same teaching regarding infant feeding that is applied to the northwestern and northeastern part of the United States does not apply in the South.

Dr. Barbour (closing).—I think Dr. Snyder in a way agrees with me when he says that babies in the South cannot take fat so well as babies in the North. There is some reason for it whether it is climate, heredity or what not. All children cannot take the same kind of food with the same kind of ease and comfort. Certainly a great number of children take fat with a great deal of discomfort to themselves, their parents and their doctors. I do think that some children have fat intolerance because they cannot take the same kind of fat that other children do with ease. It is the same way with sugar. Some children cannot stand so much sugar as others.

As to the point Dr. Clarke has brought out, I think that the experience in Paris has shown that it is possible to feed children with whole milk, but if you feed a child whole milk you can make the child sick by giving too large quantities. If the percentage is right and you can control the mothers and fathers in the amount they feed the babies, perhaps it can be used. I do not believe it works out in our children because we have no such control over our patients.

AN EVALUATION OF MENTAL TESTS*

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Even the briefest sort of treatment of this topic would demand a statement of at least two forms of evaluation. Owing to the popular conception of the imponderable nature of mind, one is obliged at the outset to evaluate mental tests from the scientific point of view. This having been done, there will arise the purely practical question as to whether the use of the tests has been productive of desirable results. The present paper will attempt a brief treatment of these two phases of the subject assigned me.

I

It will be recalled that psychology at the time of its divorcement from the philosophical disciplines undertook to quantify its findings, and thus to place itself among the sciences in accordance with the accepted criteria of science. With the work of Fechner, Weber, Helmholtz and Wundt, the analysis of the sensory content of consciousness by introspection had its beginning. Naturally their investigations began with the sensations. Only within comparatively recent years have attempts been made to carry the experimental method of study into the field of the higher processes. The impetus for this work seems to have been imparted by the investigations at Wurzburg, but it was ably seconded by studies in America. To the work accomplished by these investigators we are indebted for most of the significant data of what we now call general psychology. By it was marked the change from the theoretical discussions of faculties to the analysis of mental processes into their elementary components, a change quite comparable with that from the methods of alchemy to those of chemistry.

The enthusiasts were quite prepared to see the text-books of psychology become as full of formulae and tables as were the text-books of the physical sciences. This prophecy was not entirely fulfilled, though encouraging progress continued for some time to be made especially in the establishment of standards of research and in the refinement of technic. As time went on a distinction began to be raised which had been suggested, in substance at least, by Brentano, namely, the distinction between thought act and thought content.

During the imageless thought controversy that enlivened psychological discussions a decade ago this distinction divided the psychologists into two rather distinct camps, one adhering to the notion that mental processes are wholly made up of the residual effects of sense processes and that they become exhaustively described when these sensory components have been analyzed, the other holding that while the structural or content aspects of mental processes are analyzable, the thought act or functional aspects are not accessible for scientific description. The thought act, like the life element of protoplasm, is elusive. This controversy has not been settled, but its results have been felt in the formation of several new and vigorous movements of modern psychology. It appeared that whatever we might be able to say concerning the structural features of mental processes we could draw no conclusions from these facts concerning the pressing practical question of the efficiency of thinking or of the thinker.

There seems to be no essential or fixed relationship between the imaginal or sensory materials of a concept, for example, and its meaning. Since the thought processes deal with meanings and values rather than with their own sensory data, the emphasis soon began to shift in American psychology to what may in a very general way be described as functional psychology. Galton had found years ago that many English men of science were scarcely able to discover the imaginal content of their thoughts, yet good thinkers they undoubtedly were. This seems to indicate that from childhood to maturity, in races, one might say, as well as in individuals, efficiency of thinking and richness of mental content are frequently found in inverse ratio. If the thought act and its image

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are in any way identical this would seem to be inexplicable, for images appear not merely to change their form but actually to get out of the way as quickly as they can be dispensed with.

In conformity with this idea it seemed desirable to lay additional emphasis upon those aspects of mind which underlay efficiency of thinking, and leave to the pure scientists, who need no practical reward, the task of scrutinizing images.

If we take the Aristotelian viewpoint that the reality of mind, as of everything else, must be conceived in terms of the work it performs, we may find good ground for concluding that the psychology that we have chosen to designate functional is on a sound scientific basis. Mental tests unquestionably have their place in this sort of psychology if they have any place at all. It might be said that mental tests grew up to meet the needs of psychology quite as well as to supply the demand for a practical instrument for measuring mental efficiency. Although the step that gave the impetus to the mental test movement was taken in Paris by Professor Binet and Dr. Simon, in 1895, in obedience to a call of the Board of Education for a means of diagnosing defective children, Professor Cattell, of Columbia University, in 1890, had begun to formulate a system of tests with a purely scientific purpose in mind.

Like every other new movement in science, this one had to run a gauntlet of criticism. Experimentalists in psychology, being accustomed to mental analysis of a more refined sort and under control conditions, found it difficult to accept the crude quantifications in terms of age levels, with units of measurement made up out of different sorts of tasks of a complex character. They felt that psychology had begun to exist as a science by getting away from the handling of mental syntheses. This mental test movement seemed to be a return to the old confusions: it was abandoning chemistry for alchemy.

In the light of the atomic theory and the results of its use in chemistry the road to progress seemed to lead in the opposite direction from that in which this new movement was headed. Quantifications were necessary for science, to be sure. The Fechner-Weber law, the earliest fruitage of the infant science, was a model in that in it one knew what was being measured and the calibrations were in terms of elements that admit of no further analysis. But what these mental tests were measuring and what the unit of measurement was could not be stated in terms of the generally accepted data of psychology.

The students of mental tests could not but accept the logical validity of these criticisms. Nevertheless, their work continued and is still continuing. So far as we can now see the interest in the subject has not yet reached its maximum. If the structuralists or "image-mongers" had had their way mental tests would probably have been ruled out of psychology entirely, for, ignoring the fact already alluded to regarding the lack of dependence of mental efficiency upon mental content, with children and defectives introspection cannot be utilized.

Regardless of implications Binet plunged *in medias res* and devised his simple scale of tasks and set to work to refine it by empirical methods. Whether scientific or unscientific, it began to excite interest by reason of its promise of social and educational usefulness.

Owing to the movement of behaviorism, which arose not only as a stout opponent of introspection methods but as an exponent of the very sort of objective methods that suit the purposes of mental tests, a niche was provided for this sort of scientific inquiry. There are certain doctrinaire adherents of the opposing schools who adhere to their claims of exclusive and universal methods, but for the most part a *modus vivendi* seems to have been established.

II

As to our first question concerning the scientific validity of mental tests we have, if our reasoning has been correct, arrived at a favorable conclusion. Regarding the second phase of the question, namely, the practical application of tests, we are obliged to say that if the formulation of new tests can be used as an indication of present interest, there is assuredly no sign of a slump so far. On the contrary, of making many tests there seems no end.

Those who agreed with Wundt* in the claim that practical aims unfit one for scientific pursuits or with Titchener, his able American exponent, who insists that science and technology must be kept apart, would not consider the test of practical utility to have any scientific merit.

If the claims of pure science were valid, psychology at the present time would be facing if not actually in the midst of a period of decadence, for this seems to be a day of applied psychology. It is not well to put any science to work prematurely. This is not less hazardous, however, than to excuse it from work altogether.

In spite of the mass of absurdities and crudities that have come within recent years from certain neurological cults, the cloistered psychology of the laboratory has had to acknowledge that from the medical field it has within recent years received some of its most valuable contributions. Evidently the pursuit of the very practical aim of relieving human suffering does not always result in scientific sterility.†

The use of mental tests received its greatest impetus during the World War. One only needs to glance through Volume XV of the National Academy of Science Memoirs in order to appreciate how well the problem of handling a conglomerate of five million men was met by the use of the Army tests. Despite the necessarily hasty formulation of the tests and the crude conditions under which they had to be applied, their serviceableness is beyond question. Only an approximation to accuracy could be expected, but even that was of great value. This plan of handling men has been carried over into business with the result that side by side with the three traditional pillars of organized business, i. e., production, capitalization, and distribution, the business of the future will place the organization of personnel. Mental examinations will necessarily constitute the basis upon which this organization will be made.

The use of mental tests has become an important adjunct in the study of the problems of criminal responsibility, delinquency, prostitution, dependency, etc., and has entered largely into modern studies of eugenics and other issues under consideration by the social sciences. They promise to be the means by which education can rid itself of the Procrusteanism against which so much has been said and in correction of which so little has been done. People thought that when Preyer began the era of child study in Germany, a movement that was introduced into America and ably fostered here by G. Stanley Hall, this educational affliction would be remedied. But the study of the generic child is only one step away from institutionalism. The ultimate step is the use of the means of estimating the concrete, individual mind.

To subject all types of mind to a standardized training means in education precisely what such a method would mean if applied in a hospital, only the results of its application are unfortunately not so open to observation. In short, education without mental tests of some sort is like medical treatment without diagnosis. To be ignorant seems in the public mind to imply merely an empty mind that is to be filled by the common standard stuff that is supplied at public expense. There is no way out of this primitiveness except by means of mental differentiations. The child of low intelligence is either mishandled or rejected, whereas the child of genius has been shown to be an even greater misfit in our system.

The knowledge arrived at through mental tests of the nature of general intelligence, or intelligence quotients in their relation to an individual's educational possibilities or prognosis, will not only serve to settle finally many of our disputes concerning the value of this, that and the other study, but it will place the teacher somewhat in the position of the physician who first knows what he has to deal with before he proceeds to plan his treatment. Or to introduce another profession, which, like medicine and unlike education, has successfully applied scientific principles, the engineer is expected to know the

*Wundt, William: Ueber reine und angewandte Psychologie. Philospohische Studien, 1909, 5. 1-47.

†From the respect which medical authorities sometimes accord the findings of psychologists one wonders if they do not imagine themselves as running accidentally upon a lot of asses while in search of their own kingdom instead of vice versa as per Saul.

stresses and strains to which each type of material in his building or bridge is to be subjected and the amount of stress and strain each will bear. That no such exact knowledge is utilized in education needs scarcely to be asserted. That it should and, now that mental tests are becoming rapidly more dependable, could be applied would seem beyond dispute. This argument may sound like a plea for better education. In the present connection that is not my immediate purpose. I am attempting rather to argue from my viewpoint as a teacher in the interest of mental hygiene.

I feel that you will agree that when the teachers of the country cease to disregard individual differences, and especially when they cease to press upon minds in the hope of accomplishing the impossible, when they know something about the problems of stress and strain, resistance, frictions and lost motion in the mental machinery with which they are called upon to deal, we shall have a more wholesome childhood, a happier and more efficient adulthood and fewer commitments into our hospitals.

III

I do not mean to say that mental tests have been perfected to the point at which they have become a matter of rule of thumb. Every one who has anything to do with their use, either scientifically or practically, realizes that much work is yet to be done by way of refinement. Stress has recently been laid* upon the fact that among the aments we meet far more frequently than we had originally supposed conditions of mental derangement that make the determination of mental levels a very uncertain matter. There are other complicating factors such as personality, traits of character, temperament, attitudes of mind, affective tones, complexes which unquestionably have to do with one's mental behavior, but which so far have, for the most part, escaped scientific handling.

Mental tests can, when properly administered, sample the cognitive processes with encouraging success, but not all of mental life is cognition. In truth, many factors that determine success in school and out are not cognitive in character and hence lie beyond the reach of our measurements.

One of the sources of error that seems to be minimized by some, but that I find it difficult to eliminate, is the personal equation of the examiner. This factor has its influence in the school room and I see no reason why it may not have effect in the clinic. With the proper sort of training qualifications for examiners the errors of the personal equation may be materially reduced.

*Goddard, H. H.: The Subnormal Mind vs. the Abnormal. J. Abnormal and Soc. Psychol., XVI, No. 1, 1921. 47-54.

DISCUSSION.

Dr. Harry W. Crane, Chapel Hill, N. C.—Mental tests could be of service in weeding out, before they begin the practice of medicine, those who are unfit to enter that calling. I had this personal experience. A student who, through some slip in the administration, had entered the pre-medical group at the Ohio State University, failed to make good, though no one seemed to know why. As psychology is a required course for pre-medical students, this man came to my notice as a student in one of my classes. His work was of such a character that I gave him a general mental examination, and found him to be definitely feeble-minded. Through learning by rote, he might have happened to slip by the State Medical Board. It would be far better for the profession if such people were weeded out by some sort of mental test.

A number of people in this discussion have mentioned the necessity of calling upon some special authority on psychology in relation to all types of cases. It was stated that where an operation was indicated, such an authority should be called in to indicate whether there was a psychological basis for the symptoms that had been encountered. The psychologist who is to be of real assistance to the medical men must be more than a general psychologist. He must be especially trained in the field of abnormal psychology, must have had courses in neurology, and should have had experience in the taking and evaluating of family history and environmental data, if he is successfully to aid the medical men in determining which of the abnormalities of the patients are due to so-called functional disturbances, and why these abnormalities have thus occurred.

As illustrating the inability of many physicians in general practice to deal with even the simplest mental cases, I shall mention an experience that I had when examining the patients of a county poor farm. In this institution was a woman about twenty-five years old, a clear case of congenital feeble mindedness. There was no indication of a psychosis. When I asked the county physician, who was in charge of this case, as to her condition, he said, "Oh, she is insane." I told him I thought she was merely feeble-minded. Looking at me in the utmost surprise he replied,

"Well, what is the difference? She is not right, is she?"

That was not in North Carolina, but no doubt North Carolina and Arkansas, and other places could supply a large number of practitioners who would be poorly qualified to pass on mental conditions. In other words, physicians in general practice are continually meeting with cases in which psychological examinations must be made, if an adequate disposition is to be made of the patient, and yet they are generally unable to make these examinations themselves.

The physician should not expect the impossible from the psychologist. He should remember that psychologists, as well as physicians, make errors. Reference has been made here to a psychological "rule of thumb." There is no such thing, and there never can be. Psychological methods in the study of cases must be as variable and as dependent upon the individual case as are the physician's methods of therapy.

Dr. Sidney Schwab, St. Louis, Mo.—Patients in a neuropsychiatric out-patient clinic as well as all cases in the wards of a hospital which have a neurologic interest should have mental tests made. These tests should be a matter of routine in certain classes of cases but the interpretation of the results should not be conventional and stereotyped. In the wards of the Barnes Hospital and in the Dispensary of the Washington University such tests are made and they have proven to be of steadily increasing value. Dr. Smith who has charge of this work has devised a graphic record of normal levels and the levels of a great variety of different nervous and mental diseases. These show often a striking parallel to the diagnostic conclusions which are arrived at from the clinical study of the same material. In paresis, for example, the intelligence curve plotted out enables a preliminary diagnosis to be made which is confirmatory of the tests and data found in the clinical study. Another great source of value is the therapeutic direction that may be given in cases in which adjustment to environmental factors is to be made. Mental tests of themselves are of little value unless an attempt is made to analyze the sources of the lowered intelligence defects as shown by the examination. A great many hundreds of such tests are now matters of permanent record in the hospital and outpatient clinic and they are of great value.

Dr. L. E. Bisch, Asheville, N. C.—That the professional psychologist should become better acquainted with the neuropsychiatrist, and he in turn with the psychologist, is a scientific necessity which admits of no dispute. In the diagnosis of feeble-minded and mentally-retarded children the two viewpoints continually overlap. Many so-called "clinical psychologists" practice mental testing in a sort of rule-of-thumb method, without paying proper attention to interpretation of the tests and the individual differences of the person tested; and in consequence the whole subject has sometimes been misunderstood by physicians.

Mental tests do not pretend to measure all phases of mental capacity or all mental traits. All they attempt to do is to elicit responses and performances that will tabulate with fair exactitude certain phases of mental ability. Before criticising mental tests, neurologists should bear in mind what such psychological procedure tries to accomplish. Thus, the real function of mental tests is to objectify and measure the degree of intellect which an individual can command at the time of examination and to clarify the discussion of his case by referring his mental status to an objective scale which all competent and informed persons can understand. Their great value consists in liberating the diagnostician from the old-time vagueness and uncertainty which was the inevitable result of purely subjective standards.

I have worked with psychologists and their methods can very nicely be dovetailed with neuropsychiatry.

Dr. G. H. Benton, Miami, Fla.—A psychiatric study of the individual during the tests is many times as productive of facts as the answers to the questions proposed, and any one stereotyped method or system cannot be presumed to elicit all the facts of the individual's ability to meet the demands, obligations and emergencies of life as they arise.

Two instances came to my attention while in the Neuropsychiatric Division of the War Risk Insurance Bureau in 1919, one a second lieutenant who had been progressively promoted from the ranks and had carried on very well during all his Army experience. Subsequent to the Armistice, however, and after discharge from the Army he was admitted to a Neuropsychiatric Hospital and tests showed a mental age of seven years and three months. Now it is quite apparent that this man had more ability than could be presumed for a child of seven and one-fourth years.

The second case was a sergeant also promoted from the ranks. Presumably promotion was the result of a display of efficiency in service, yet a mental test later resulted in a score of nine years capacity.

Mental tests have a specific value: even inadequately accomplished they point in the direction of both possibilities and probabilities. They do not, as many suppose, tell the whole story, and as the last speaker suggested we should with much care weigh the facts elicited and their combinations, and accurately evaluate them to avoid error in diagnosing the actual condition present.

Dr. Fletcher (closing).—I agree with Dr. Crane that we should consider all types of tests as instruments comparable with microscopes in that they are of value only in the hands of those who are trained to use them. Always the results to be achieved by the application of the tests will depend upon the skill and effort of the individual applying them.

A CASE OF HYSTERIA*

By E. Bates Block, M.D.,
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Although the mental state and the various hysterical manifestations to be related in this case have often been seen by all of us, it is a remarkable case in the number of hysterical symptoms which occur in one patient. The period of observation extended from 1915 to 1921, although very few symptoms have occurred in the past year.

Miss X, age 27, was seen first on July 29, 1915.

Family History.—Her father died from paralysis agitans. Her mother was living and well, but had asthma at the menopause and is now deaf. Her mother's father had asthma. One brother was living and well. Four sisters were living and all were well except one with habit spasm. Her mother had two miscarriages. Her father's father had paralysis for twenty years before he died. The father's mother died of tuberculosis and was erratic. The mother's mother died of carbuncles. The mother's father was a heavy drinker. The mother's ascendants believed in wine, woman and song. The mother's father and mother both married twice and the father's father married twice.

Past History.—She had had measles twice, mumps, whooping cough, chicken pox, scarlet fever, typhoid fever, and chills and fever. She had a knife cut over her left eye at the age of 4 years. She broke her coccyx at 14 years, and it was removed at 17 years. She had no relief from the operation. The right ovary and appendix were removed at 17 years, and also cysts from the left ovary. There were no menses for six months after the operation. At 19 she had her clitoris removed. The reason was not known. She was curetted at 17 and 19 years of age.

At the age of 20 cysts were removed from the left ovary. She had another operation at 21. The right floating kidney was sewed up, cysts were removed from the left ovary, she had a ventral fixation and a tube was put into the cervix. At 23 she was operated upon for adhesions; at 25, for intestinal obstruction. The left ovary, fallopian tubes and uterus were removed. In all she had had ten operations and she had anesthesia before the first operation to break the hymen. She had carbuncles frequently all her life, all over her body. She had unconscious spells seven to eight times daily when 14 years old and ever since then, associated with rapid heart beats. She became pale, but had no jerking, foaming at the mouth or biting of the tongue. The attacks lasted two to three minutes to one hour, and she did not sleep after them. Any emotional excitement would bring them on. She never had one on the street. On finding she was going to have one, she would go to a doctor's office or home. She had spells of shaking all over, especially when tired. She always vomited with this and had severe jerking at the pit of her stomach. She was a music teacher from the age of 22 to 27 and taught 25 to 60 children at a time.

Several erotic attempts were made upon her at the age of 15 years. Her menses started four months after this and the period was always irregular.

Motor System.—She had convulsions from the age of 3 to 4 months till she was 4 or 5 years old. There were many attacks of myoclonus, involving chiefly the abdominal muscles and diaphragm, occurring ever since she was a child, and at times involving the arms and legs.

In 1919 there were cramps in her left hand and left foot which were visibly drawn. Hiccough was occasionally a troublesome symptom. Convulsive tic of the left side of the face occurred at intervals from the age of 12 to 23, lasted about two weeks in 1917, and ocurred at intervals after that. It was brought about through imitation of her sister who had the same trouble, the latter having developed it in imitation of a child whom she was teaching.

She often saw a soldier who had no use of his right arm following a gun shot wound of his elbow, and she developed a paralysis of her left arm for nearly a month from suggestion.

In 1915, she had an almost complete aphonia, which recurred in 1919. There was frequently a marked dysphonia. At times there was stammering and at others slurring of the speech. In 1920, there was a transient attack of diplopia. In 1919, there was an attack of marked dysmetria affecting the arms and legs and decided ataxia in 1920.

Sensory System.—There were frequent headaches for which no anatomical cause could be found and they were more difficult to relieve than organic headaches.

In 1916, she had a severe neuralgia over the left antrum and in 1919 over the whole left side of her face and in the left eye. In the latter attack there was some swelling of the left turbinate bone and a pulp stone was removed from a left lower tooth. There were, however, many other attacks of left trifacial neuralgia in the following two years for which no organic cause could be found. In 1920, she had a severe attack of left sciatica and later several attacks of left intercostal neuralgia.

Psychic Condition.—There was abnormal sensibility to external impressions. She was very imaginative and very susceptible to suggestion. She had a love of approbation, but no abnormal desire for attention or notice. She showed great variation in moods and her judgment was poor for herself, but good for others. She had disliked exercise since September, 1914. When nervous she had poor control of her thoughts and no control of emotions or actions. She had a tendency to act upon sudden impulses, and was generally unreasonable when nervous. She had been very irritable since May, 1915. One person, then another in the family irritated her "until she could scream" if he or she merely came into the room.

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

The antipathy to one person would pass off in a few weeks and then she would develop antipathy to some one else.

Hysterical Paroxysms.—She had frequent crying spells, laughing spells, choking sensations, globus hystericus and violent outbursts of temper. She felt nervous and at times apprehensive and as if she were going to die. She had a morbid fear of the doctor who operated upon her. She had a smothering sensation and hot and cold flashes. She had an inclination to shout, but has never done so. She was in constant bodily motion. She was delirious for two weeks after the removal of her clitoris. She had attacks of opisthotonus, abdominal distension, persistent attacks of belching and often rumbling noises in her abdomen.

Since the age of 14 she had been interested in psychic phenomena and mental telepathy and became very expert in it, she said. She was very receptive to mental telepathy. She believed in the Indian Karma or inheritance of debts in previous incarnations and debts that others owed her which must be worked out in this life. She had spent much time studying occultism. Since the age of 12 she had had "hallucinations" of sight and hearing, but never believed these false observations to be real and was never deceived by them.

The senses of smell and taste were always poorly developed. She had a remarkable power for memorizing. She was an extremely rapid reader. She ordinarily read six books in one day and had time left over. She always spoke rapidly. Anchor A and top C appealed to her as musical tones. She remembered things seen and read in visual images. Her auditory memory was better than most people's, but not so good as her visual. She believed that "wishes were horses" and that the wish was father of the thought.

She had an intense love for children, probably increased by her knowledge that she could not have them. She wished to marry a widower with a child. She finally went so far as to tell her family that she was going to marry a widower with a child, and when they spoke of her not getting letters from him, she began to write love letters to herself and send herself candy, flowers and telegrams. Finally she announced the date as November, 1915, and sent out invitations to the wedding. A few days before the supposed wedding her belief weakened and she was called suddenly to New York, where she spent her time trying to adopt a child. Failing there, she went to Chicago, and, failing again, could find no way out of her dilemma except to claim that he had died. She then went to a morgue; claimed a dead body; had him shipped to Atlanta for burial; put on mourning and came home with the body. The deception was apparent; and she was forced to admit it, after showing many discrepancies in her statements and conduct. She seemed, however, to be in a twilight condition, and at times showed a dual personality, with remarkable attacks of amnesia lasting as long as nine days.

Later she adopted a child, but as he had pellagra, she was forced to give him up. At times there was marked somnolence lasting from two to ten days and often persistent insomnia. Somnambulism had existed since the age of 15. All her family except her mother walked and talked in their sleep. One night she put the baby under her bed and when she awoke found her feet muddy. Another night she awoke in the hall of the doctor who had operated upon her and who lived across the street. It made her very unhappy to live near him and she set fire to her house three times in one day, but the fire department put it out without much damage. There seemed to be no knowledge on her part of this pyromania until it was recalled by psychic analysis, when she seemed much surprised to know that she had done it.

There were frequent suicidal threats and several suicidal attempts with veronal and morphin. There were fainting spells of short duration and several unconscious spells lasting from 2 to 8 days.

Confabulation was a marked feature of the case, and while I may not always have succeeded, I have endeavored to eliminate confabulation in every instance and to record only such observations as were objective, substantiated by the testimony of others, or rendered probable by her mental and emotional state at the time of their occurrence. All records were rechecked at later dates and often eliminated as probable confabulation.

She was abnormally truthful until her cervix was dilated and the uterus suspended, but after that she had a constant tendency to lie. Her sublimation took the form of excessive activity in teaching children and she attempted to do more than it was possible for any normally healthy person to accomplish. She refused to rest, take vacations or recreation, and most, if not all her nervous breakdowns were traceable to defense reactions in which she unconsciously sought excuses for rest from her work, which she refused to do consciously. Thus on the eve of a recital at which she was to play the accompaniments she developed a paralysis of her left arm, or an unconscious spell, etc.

Association tests revealed a prolonged reaction to "water," "lake," "to die," and these were explained by two previous experiences. At the age of 18 months a horse ran away and ran upon a pedestrian swinging bridge. The buggy was upset but caught; and she was lifted out unhurt but badly frightened. At the age of 9 years she went to a natatorium and was drowned, that is, was unconscious for an hour. Up to the time of this analysis she had a great dread of going over trestles, bridges and foot logs.

Somatic Symptoms.—Her pulse rate varied from 40 to 160 per minute. The heart examination was negative.

Biot's breathing, panting, rapid respiration, occurred from time to time and sighing at other times. There were attacks of cyanosis, but these were probably produced by acetanilid taken for headaches. Hysterical coughing spells occurred several times. The body weight fluctuated greatly, going up and down as much as 24 pounds a month, and varied between 128 and 202 pounds. Her height was 5 feet 8 inches.

Salivation was an occasional but troublesome symptom.

Vomiting attacks were sometimes violent and persistent, lasting as long as three days with very acid vomitus.

Obstinate constipation in attacks was a marked feature of the case. They dated from her operations in 1917, and she sometimes went from 3 to 14 days without a movement. The attacks were not influenced by purgatives, but were relieved by whiskey, morphin or eserin. There were fifteen to twenty such attacks. The x-ray examination showed considerable stasis in the cecum and transverse colon. The cecum was extremely low, as was also all of the large intestine with the exception of the splenic flexure. Colon injection showed apparent adhesions of the sigmoid and cecum. Large doses of thyroid gland extract always prevented her constipation and it has never occurred while she was taking it.

Polyuria occurred in attacks, but more frequent were attacks of oliguria or anuria, total suppression occurring for as long as two days. Even when she took 96 ounces of fluid a day the urine output was only 8 to 16 ounces. She often voided only once in 24 hours.

She had lumbar backache and neckache and bad pains in her eyes. Her face was sometimes pale and sometimes flushed. She never had any sexual feeling or excitement.

Genital Organs.—She complained frequently of discharges of gas from the vagina, probably air which was drawn in and expelled. She stated that she had distinct menstrual epochs (without menstruation) about once a month in which there was a tendency to bleed from any part of the body, most often from the areola of the breasts or vagina, but also from the arms, legs, nose and throat, accompanied with a drawing sensation in the pelvic region and a writhing feeling all over the body. Neckache, lumbar or sacral backache, nervousness, insomnia, irritability, tendency to cry, cramps in the lower abdomen, aching in the thighs and pain in the breasts were present, but no swelling, and rarely any discharge from the vagina. The bleeding was most often from the nose. This last was the only objective proof of her statement in regard to bleeding.

Her breasts became rapidly much larger after the removal of her ovaries. They were undeveloped before that. The bleeding was not confined to menstrual epochs, which were two to six weeks apart, but occurred at any time. It is quite probable that the bleeding was often simulated, and partly to be interpreted as confabulation.

Trophedema.—In 1915 she began having swelling of her legs, worse in the left leg, which extended from the inguinal region down. It measured about a foot in diameter at the ankle and calf and produced a picture like elephantiasis. This lasted a week, was a very hard swelling, and scarcely dented at all on pressure. There were five distinct attacks of trophedema, sometimes affecting one leg (the left)and sometimes both legs. Once the left knee only was affected, and twice the hands were swollen, blue, and mottled.

Thyroid Gland.—There seem to have been symptoms of a deficiency of the thyroid secretion since the removal of her ovaries, such as lassitude. She avoided exertion and was easily fatigued. She had loss of memory and more tendency to sleep. She slept soundly and awoke unrefreshed. Her skin was dry and cracked on the fingers. Brown spots came on the backs of her hands and chest. Her hair became dry and broke off, fell out and was less oily. She had a tendency to grayness. Her eye lashes fell out. Her skin became thickened and she gained weight. She suffered from cold weather. Her hands and feet became cold. She had creeping sensations down her back and nervous chills, poor appetite, obstinate constipation and slow pulse (40).

Overdoses of thyroid gland produced the following symptoms: insomnia, irritability, restlessness, excitability, a red spot on her left cheek, throbbing of the heart, excessive perspiration, caused her to feel as if she had fever, trembling on exercising, choking sensations, air hunger and rapid heart.

Endocrine Therapy.—She obtained more benefit from thyroid substance than any other gland. Lutein seemed to have no effect nor did ovarian tablets help her. Mammary substance had a sedative influence. Orchitic substance produced a peculiar feeling where the ovaries used to be and also behind the breasts (not in the breasts). They reduced the quantity of urine, caused constipation and a miserable feeling in the lower abdomen with a tendency to cry and hysteria, according to her observation.

It will be noted that the symptoms have been arranged in neurological groups, rather than chronologically, for the sake of brevity and to avoid repetition.

DISCUSSION.

Dr. W. R. Houston, Augusta, Ga.—We cannot sufficiently admire the arduous patience that Dr. Block has brought to the study of this astonishing case. Speaking as an internist, I have been wondering if I could find out from some psychoanalyst what the essential thing is that makes a case like this. What is the ultimate cause, the thing on which we can focus as being the clue to unravel its pathogenesis? I have tried to put the screws to our modern neurologists, to get them to unfold the kernel of the matter. But when I press them hard it comes finally to a more or less distinct intimation that it is not given to me to understand. They tell us that it requires ability above the usual to compass the nature of these problems, some extraordinary susceptibility for the apprehension of the intangible, something given only to neurologists. The cause and the cure of these states must be for others a baffling mystery.

Of course, we can understand the re-education of frail minds as taught by Dubois. We can understand in a way the suggestive therapy of Babinski. We can understand Bernheim and Janet or Sollier's physical therapy, and we can even form a notion of the efficacy of Eddyism, or St. Anne of Beaupre. But it is very hard to un-

derstand how certain things are arrived at by the study of the patient's sexual life.

Dr. Block tells us that, in this case, a man got into the lady's bed and startled her so that all these remarkable symptoms ensued. There must surely be something more than that. How can such a commonplace cause have produced such unusual results?

This unfortunate patient is certainly deserving of something from the profession. Even the profound sympathy and unfailing patience that the essayist has expended are hardly enough to counterbalance her wrongs. We are forced to the conclusion that she was brought to her deplorable condition largely through the efforts of the medical profession. It is reassuring that Dr. Block's sympathetic care has restored to her a measure of nervous stability.

Simply stated, the patient was born a poor, weak thing. In neurologic parlance she was congenitally a psychopathic inferior, and she did not in earlier days get a fair deal.

Dr. B. L. Wyman, Birmingham, Ala.—The case is a remarkable exposition of the characteristic psychic disturbances which we often see in the hysterical patient. The clinical history of the patient clearly demonstrates the fact that surgical procedures upon the pelvic organs in the neurotic female very frequently fail to relieve the condition, but often aggravate and increase the psychoneurosis.

Dr. L. E. Bisch, Asheville, N. C.—The dramatic content of this patient's symptom-complex, as summarized by the essayist, might readily be misinterpreted as pure fake by the uninitiated. Yet I venture to say that the woman in question did not try to be mysterious, and probably suffered untold mental anguish in trying to make herself understood and in her repeated attempts to find a cure.

It cannot be too strongly emphasized that the neurotic does not understand herself. Hence, it is difficult and often impossible for her to convey a correct impression of her true state of feeling to the physician. The physician on his side must never fail to realize that in dealing with distorted thinking he is confronted with one of the most complicated problems in the entire subject of medicine. But the apparently unsolvable should not deter us. We must be patient and sympathetic, willing to take the time to dig deep and carefully.

Doctors often forget the psychic side of their patients, even though they be skilful and successful in treating organic disease. How often is surgery resorted to when mental therapy was really what the patient needed? Let us not forget that the mind is, after all, a most neglected field of inquiry.

Dr. Block's patient shows so well what mental defense reactions may result in, what curious physical symptoms may be brought about by psychic conversion, what vagaries of thought, behavior and emotion may come to pass in a neurosis. Cases such as this should be recognized and treated early. More interest in psychology on the part of physicians would prevent many neurotics from progressing into such a chronic state that amelioration of even some of their torments becomes a Herculean task.

Dr. L. L. Cazenavette, New Orleans, La.—Much of this surgical intervention, we feel, could have been avoided in this case. It serves as another instance where neglect of a thorough examination of the nervous system, before operation, led to additional psychic "trauma" and thereby made conditions worse. Efforts should be directed towards creating a better and greater co-operation, in obscure cases, between the surgeon and neuro-psychiatrist.

Dr. G. H. Benton, Miami, Fla.—There are in attendance at this session today, many men not primarily concerned in neuro-psychiatry, who should from this exposition readily recognize how closely these functional maladies may simulate organic factors, and, therefore, how readily the neuro-psychologically inexperienced but honest practitioner may be misled by the recital of symptoms, by the conduct, by the mental attitude and by the personal conviction of the patient who seeks relief.

The neuro-psychiatrist is trained to apprehend the attitude of mind of his patient, the quantity and quality of his reactions, and thereby to determine largely whether the symptom recited and adhered to, is really a part of a legitimate physical syndrome, or a physical response autonomically induced as an unconscious excuse for a mental complex situation that is overbearing the patient.

These patients, although they represent different degrees of hysterical personalities, are seldom quite capable of meeting alone the exigencies of life as they arise, and few are capable or have the opportunity to acquire adequate adjustability. They are therefore continuously forced into trying to escape the realities of life through subterfuges. These are fully unrealized by themselves, but precipitate physical states in which they are glad to acquiesce, as it furnishes them with a seemingly legitimate excuse for the incapacity of which they are in no way conscious and therefore cannot admit. The mental state is constant, and the ability to adjust so limited with the continual demand by new situations, that a series of phases or perhaps entirely new phenomena are successively added to the older aspects until one disease picture after another is represented, and so is often honestly accepted by the physician as an organic malady. Thus surgical interference is induced usually with deplorable results.

This class of patients passes from one phase or condition to another, and from one practitioner to another, to the general practitioner, to the specialist, to the surgeon, to the Christian scientist, to the osteopath and the chiropractor, to the faith healer and the fortune teller, continuously acquiring new suggestions or augmenting the old ones, acquiring little or no relief from the condition. Many a history represents just such a series of episodes as has been detailed by Dr. Block.

Dr. Walter J. Otis, New Orleans, La.—I should like to ask the Doctor if these observations of his case were made in a sanitarium or at the patient's home, under intelligent supervision?

The case savors very much of one of a constitutional psychopathic personality with exaggerated sexual psychopathy, symbolic in content, with hysteroid fugues.

It is interesting to note her personality changes and various conduct behaviorisms.

The case is interesting from the standpoint of the neuro-psychiatrist, and is evidently suitable material for analysis.

Dr. James J. Terrill, Dallas, Texas.—We often try to get our patients well of the hysterical symptoms on the wrong basis. A case of hysterical contractures of the hands which I have in mind illustrates this. The surgeon removed the tonsils with the strong suggestion that it would cure the contractures. To the great delight of all, when the patient came out from the ether she could and did use her hands. But this was not permanent as the hands soon contracted again. One often thinks in this way that he has cured the patient, when he has only relieved one symptom, and sooner or later other equally distressing symptoms occur. We should seek for the underlying mental conflict and remove that. Even in these cases, the most permanent results will be secured upon a basis of frankness and truth.

Dr. Tom A. Williams, Washington, D. C.—To my way of thinking this case is not only a hysteric, but one of disordered metabolism, as indicated by the susceptibility to carbuncle, as well as of endocrine unbalance, as shown by the presence of irregular menstruation and ovarian cysts, irregularity of mammary development and of polyuria. The myoclonus is also significant as illustrating metabolic disorder. As also are the headaches and the neuralgias.

It is possible, indeed, that the suggestibility itself is only a function of lack of application and discipline rendered too difficult because of the uneasiness of the tissues from metabolic disorders which were probably increased by the fall of the intestines and the scantiness of thyroid secretion.

Dr. Block (closing).—The patient was of a character and training that would not lead her to condone any impropriety. Her religious instinct was very highly developed. She had quite an acute sense of right and wrong. She was conscious of her real danger and was extremely conscientious. It was this herd instinct that produced her complex.

It is true that the cure of hysterical symptoms does not cure the patient. However, should we cure each of her hysterical symptoms, on account of the surgical operations she has had, I think it very doubtful indeed that we could make a complete cure. She was badly handicapped by the surgical work, but at present she has a good physical and psychic capacity and is able to attend to her work more or less accurately.

PROGRESSIVE LENTICULAR DEGENERATION*

By M. L. Graves, M.D.,
Galveston, Texas.

Ever since S. A. Kinnier Wilson presented his thesis upon "Progressive Lenticular Degeneration" at the University of Edinburgh, in 1911, and published his research in *Brain*,[1] in 1912, this peculiar and rare disease has excited the interest of medical men all over the world. About thirty cases have been reported in the literature, fully one-half of them by American neurologists. The disease has become widely known as Wilson's disease.

Variations in chronicity, in clinical symptoms, and in the extent and distribution of pathological lesions have been reported by various authors; but no fundamental addition has been made to the knowledge of the disease since Wilson's original contribution.

The disorder is manifested by a group of neuro-muscular symptoms, associated with two definite pathological phenomena, which are in Wilson's opinion constant; and no diagnosis of the disease can be sustained without the presence of these essential pathological lesions in the corpus striatum and in the liver.

Authors have reported cases of apparently typical lesions in the central nervous nuclei, without hepatic changes. But in Wilson's[2] latest article, published in *Oxford Medicine*, Vol. VI, he recognizes no case without hepatic cirrhosis as a true form of the disease he originally described. The lesions in the corpus striatum embrace acute and chronic changes occurring in the putamen and extending to the globus pallidus and sometimes to the external capsule, or even to the caudate nucleus; but never, according to Wilson originally, to the internal capsule or the optic thalamus.

Recent American authors have proven conclusively that the disease does extend to the thalamus and to other areas of the brain, and Wilson has accepted these re-

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ports in his latest article, but he rigidly adheres to his first conclusion regarding its pathology.

These acute and chronic lesions consist of areas of softening, accompanied by increase of glial tissue, and in advanced cases, by degeneration with cavitation.

Howard and Royce[3] report a case, published in the 1917 *Transactions of the Association of American Physicians*, with "progressive degeneration of the neurone and glial elements of the basal ganglia, most extensive in the lenticular nucleus, but involving the optic thalamus, caudate nucleus, internal capsule and red nucleus and, to a slight extent, the white matter just beneath the gray matter of the cortex."

Fig. 1. Spastic position of body and limbs and deformity of hands and feet in progressive lenticular degeneration.

They also report more extensive histological changes in other organs than had been noted by previous authors. The lesions in the lenticular nuclei are always bilateral, though they differ somewhat in extent and intensity. Other pathological changes in the nervous system are usually insignificant. The other site of definite, and, as Wilson believes, essential pathology in the disease, is in the liver and consists of an advanced degree of cirrhosis, much more pronounced than that seen in alcoholism and lues. Without these changes in the liver and the lesions in the lenticular nuclei, as originally described by him, the diagnosis of the disease cannot be regarded as established.

The most interesting feature, so far unexplained, is that the chronic syndrome appears to depend entirely upon the minute pathological changes in the lenticular nucleus, and to be entirely independent of the extensive and intensive morbid anatomy of the liver. It is amazing to find the liver so diseased without clinical phenomena pointing to hepatic origin. Indeed, these changes are usually recognized only at post mortems.

In 1888, Gowers[4] reported the first case of this character under the name of "tetanoid chorea," and his original description, with drawings, presents as accurate a photograph of the disease as the more recent accounts.

Ormerod and Homen[5] reported cases in 1890, which added important data to the communication previously made by Gowers.

In Wilson's elaborate studies of the six cases presented in his thesis, three came to autopsy. He published photographs of the patients of Gowers, Ormerod and Homan, with their original drawings of the contractures and deformities, temperature charts, and the gross and minute pathology, and established the identity of these cases with six cases intensively studied by him, both in their clinical manifestations and in the essential pathology.

In January, 1915, William B. Cadwallader[6] reported the first American case with post mortem findings, in the *Journal of the American Medical Association.* The pathological changes in this case were so minute in sections of the brain that microscopic examination revealed nothing abnormal, and serial sections through the

basal ganglia were examined under a low power objective before small and irregular areas were found, the largest of these being reported by the author as the size of the head of a pin, with numerous smaller foci. While the clinical picture in this case appears to have been quite typical, no diagnosis was made during life and the real nature of the disease was recognized only at post mortem.

Another case, exhaustively studied and reported in the *Journal of Nervous and Mental Diseases* for 1916, was reported by Frederick Tilney and G. M. Mackenzie.[7] The patient was forty-five years of age and there were atypical athetoid movements which were constant.

Fig. 2. Fixed position of body and deformity of hands in progressive lenticular degeneration.

In the *Journal of Laboratory and Clinical Medicine*, 1916, Frederick J. Farnell and Arthur M. Harrington,[8] reported a case of a female, 19 years of age, with the usual clinical symptoms and autopsy findings.

Charles Hunter and S. J. Pierce,[9] of Winnipeg, Canada, presented a photograph of a patient, with autopsy photographs of cirrhotic liver and microscopic sections of the areas of softening in the lenticular nuclei. This case was also published in the *Journal of Laboratory and Clinical Medicine*, in 1916.

In November, 1917, John Jenks Thomas[10] reported three cases in one family, in the *Journal of Nervous and Mental Diseases*. These cases were typically familial, as described originally by Wilson, and presented marked mental deterioration with the other phenomena of progressive lenticular degeneration.

An exceptionally well studied case was published in the *Medical Clinics of North America* in July, 1918, by Frederick Tilney.[11] The author gave an extensive review of a case, with photographs of the patient, with exhaustive study of the gross and minute pathology and with such presentation of the clinical phenomena as greatly to clarify the diagnosis of living cases.

Perusal of these articles, with reports of cases since published, and Wilson's latest article in *Oxford Medicine*, will at once supply the inquirer with substantially all the information now extant regarding this important and interesting nervous disease. Two facts stand out with sharp and clear outlines in all cases reported:

(1) The clinical syndrome, consisting of a small group of neuro-muscular phenomena evidenced by hypertonicity and disturbed innervation, exhibited in tremors, both phenomena being always symmetrical, always bilateral, always definite, though not uniform.

(2) A limited pathology confined to two organs, namely, the lenticular nuclei and the liver, with no correlation of their pathological or symptomatic relationship

so far discovered. Owing to the fact that the observation of one of these typical cases may so completely fix the picture in the mind of every observant physician that any case coming under his observation presenting these phenomena may at once be suspected and quickly diagnosed, I am presenting a case history with photographs illustrating position, deformities and hypertonicity of the patient, which I believe presents a typical picture of Wilson's disease. The age is considerably

Fig. 3. Prolonged spastic smile in progressive lenticular degeneration.

Fig. 4. Spastic position of feet and legs in progressive lenticular degeneration.

greater than any of those already reported, and the patient is still living. While the disease has progressed steadily but slowly during the past four years it is admitted that certainty of the diagnosis cannot be relied upon in the present state of our knowledge until post mortem revelations attest its correctness,

CASE REPORT

Miss S. D., aged 68 years, has lived in Galveston since she was eight years of age having been born in Germany. She was admitted to the John Sealy Hospital on Feb. 19, 1917, with the complaint of a broken arm and general weakness.

Family History: Her father died at 53 years of age. The cause was unknown. Her mother died at 92 years of age. This daughter was the only child and had no knowledge of other relatives.

Previous History: She had whooping cough at five years, measles at eleven years, yellow fever at fourteen years, typhoid fever at thirty-one years, and rheumatism in her shoulders for three weeks at eighteen years. She had dysentery at forty-six, and dengue at sixty years of age. Before the menopause she had frequent attacks of headache. The menopause occurred at forty-seven years of age, and menstruation was prolonged and irregular for eight years. The patient states that her birth was difficult: that she was delivered by forceps, and that one day after birth she had spasms which never recurred.

During her childhood and all the rest of her life she was conscious of not having good use of her hands and feet. She always felt nervous and could not handle things well, although she learned to cook and sew and do housework such as washing and ironing, and was quite active in this for forty or more years of her life. In childhood her fingers, hands and arms trembled a great deal. The right hand was much worse than the other parts. She felt considerable improvement at sixteen years of age and from that time on was able to do a large amount of housework. During all that time she had a nervous sort of gait, in which she said she felt shaky and would

walk on her toes, "as if she were very proud." A sense of unsteadiness was always present and it had continued to increase, with additional weakness, since her attack of typhoid fever at the age of thirty-one. Her symptoms had considerably increased in intensity during the previous five to eight years, and during that time she had had to hold on to something when walking.

Eight years before she had a sudden seizure in the right hand, in which the wrist and fingers became flexed so that she could not comb her hair for five weeks. The shoulder and elbow were not affected. Since that time the hand and fingers have never been voluntarily extended. Five years before, the left arm was broken at the elbow and since that time the fingers of the left hand had been flexed strongly into the palm.

During that time she had had a constant rhythmic movement of flexion and extension and a coarse trembling of the fingers, increased and amplified in the hands and arms upon voluntary motion. In the left hand she kept a handkerchief or some small object to prevent intensive flexion of the fingers upon the palm, or as the patient stated, "to keep them from fighting." The feet had a similar flexion of the toes, save the big toes, with separation and adduction and the same tremor, though to a less degree. She had had some difficulty in speaking, which had of late been growing worse.

For three and a half years previously she had not been out of bed. At the time that I saw her she could raise herself to a sitting posture, and could hardly sit alone or coordinate her muscles without assistance. When elevated, she would sink suddenly into a recumbent posture with a board-like rigidity.

The only sensory symptoms complained of were a slight burning sensation in the palm of the left hand and slight pain in the back and legs.

During the past four years the patient has been under constant observation and the dysarthria has slowly but steadily advanced. There has been a progressive increase in the spasticity of the extremities and the trunk, and with this there has been a quantitative reduction in the tremors, though qualitative change is not apparent.

Physical examination of the patient reveals a moderate emaciation. She occupies a peculiar attitude in bed, requiring two pillows under her head and being turned slightly to the right side, with slight flexion of the knees and hips, with plantar flexion of the feet, with adduction and rather wide separation of the toes. The head is usually rotated to the side, with moderate nuchal retraction, and the sterno-cleido-mastoid muscles stand out prominently in the photograph. The arms lie by the side, flexed a little at the elbows or with the right arm thrown above the head and resting upon one of the pillows. This attitude is so common that it has the appearance of fixation, except in the rhythmic muscular movements, intensified by any emotional excitement or voluntary effort. Beyond a fairly well marked arcus senilis, having none of the characteristics of Fleischer's greenish sclero-corneal ring, nothing of consequence appears about the eyes. The lids and the pupils are normal. There is no nystagmus, and normal pupillary reactions both to light and distance are present. The gastro-intestinal, respiratory, cardio-vascular and genito-urinary systems are negative.

The superficial reflexes were as normal as could be determined with the muscular rigidity; but of late it has become impossible to elicit deep reflexes on account of the advanced spasticity. Coordination is impossible to determine because of the rigidity and contractures; but where obtainable it appears about normal. Equilibrium was maintained with some difficulty four years ago and was apparently due to the excessive hypertonicity. With the advance of the disease, it is now impossible.

Tremors. Coarse trembling movements of the tongue, head, facial muscles and eyelids are present. They are rhythmic and bilateral. The fingers of both hands are in a state of rhythmic flexion and extension, being somewhat finer than an ordinary athetosis and more Parkinsonian in type. These tremors have no element of intention in them, and they cease during sleep. The fine rhythmic movements may diminish or cease during voluntary movements, in which there is a mild and coarse trembling of the extremities of wider amplitude.

Contractures. There is an extreme passive contracture of the right wrist and all the fingers of the hand except the thumb and index finger. The index finger is flexed at the first interphalangeal joint. The other fingers are flexed at the metacarpophalangeal joints. The patient cannot voluntarily extend the fingers. It was formerly possible to do so by using slight force. With the advance of the disease the muscular hypertension and contractures now make passive reduction of the deformity no longer possible. All of the fingers of the left hand are flexed at the metacarpophalangeal joints and first phalangeal joints. The left wrist is not flexed. The left elbow presents deformity, due to a supracondylar fracture.

Hypertonicity. The recumbent attitude and effort at voluntary motion show a general muscular hypertension. This involves all the muscles of the extremities. The muscles of the trunk and of the head and neck appear to be responsible for the semi-constrained recumbent attitude constantly present. Any effort at voluntary movement or mental excitement indicates extreme rigidity of the muscles of the right arm and particularly those of the hand and wrist. Emotional efforts, such as laughing or crying, produce a prolonged spastic condition of the facial muscles; but the tremor becomes abated and the mouth remains open for an abnormally long period of time and thus interferes with speech and articulation, and the facies assumes a more fixed position. Dysarthria and dysphonia have slowly advanced until talking has become very difficult and almost unintelligible.

There are, however, variations in these manifestations dependent apparently upon the quiescent nervous condition of the patient. When attempting to speak under any condition of excite-

ment, as for example in the clinic, the muscles of the eyelids and forehead are in a state of spastic contraction. When the facial muscles are passive, the mouth does not gape. While there is great diminution in strength, no atrophy and no paralysis are present. No dysphagia has ever been manifest.

Her mentality is good notwithstanding the fact that any emotional disturbance intensifies her facial spasticity and gives her a somewhat silly appearance. Response to all questions when possible, however, is clear and accurate. She is cheerful and optimistic.

The laboratory examinations reveal a normal urine, and a negative serum Wassermann, a blood count showing a secondary anemia of moderate character, with 3,750,000 red cells. The hemoglobin is 75 per cent, white cells 6,600, and the differential is normal.

Diagnosis.—It would appear, therefore, from a careful resume of the neuro-muscular symptoms present in this woman, that we are dealing with a fairly progressive lenticular degeneration or Wilson's disease, and that it has existed from childhood, having a chronicity and duration, so far as my information goes, not previously recorded. My impression is that the disease began in very early childhood, was probably arrested in development until within the last ten years of life, when degenerative changes, previously but slowly progressive in the lenticular nuclei, have taken on an increased activity and in all probability, coincident cirrhotic changes have occurred in the liver. This is pure inference, as no hepatic symptoms are manifest and Seliwanoff's levulose test gives no evidence of deficient hepatic function.

One must carefully consider the pseudo sclerosis of Westphal and Strumpell, but this seems clearly impossible. The juvenile form of paralysis agitans, as described by Ramsay Hunt, presents strong resemblance and it may require post mortem determination for final diagnosis. But the clinical syndrome of bilateral symmetrical tremor, hypertonicity and deformities present such convincing similarity to the cases already reported, that I feel impelled to present the case as one of Wilson's disease.

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DISCUSSION.

Dr. E. Bates Block, Atlanta, Ga.—It is interesting to note that Dr. Graves' case did not have dysphagia or dysarthria. I think he is justified in his diagnosis. The bilateral association of contractures, spasticity, tremor, weakness, emaciation, dysphagia and dysarthria, with cirrhosis of the liver, form the characteristic features of the disease.

I had one case in which neither dysphagia nor dysarthria existed when I first saw the patient, but later developed. Usually tremor is the first symptom to develop, and this may be unilateral at first, later becoming bilateral. Sometimes the disease is not recognized at first on account of insufficient symptoms having developed to make a complete clinical picture.

There is this to be said in reference to bilateral lenticular nucleus disease, namely, that lesions in those regions of the brain may produce a similar symptomatology, yet cannot be classified as Wilson's disease. For example, in paralysis agitans we have spasticity, tremor, slowness of speech, etc., but without the childish, foolish smile and marked contractures and emaciation which ultimately develop in Wilson's disease.

Recently we have all seen a sudden increase in the number of cases with symptoms of paralysis agitans and I have wondered if they were not due to encephalitis involving the globus pallidus of the lenticular nucleus. We have seen also the disease developing much earlier in life than we were formerly in the habit of seeing. I am very much inclined to the belief that we are dealing with a variety of different phases of the same disease in different degrees of development, namely, encephalitis of the lenticular nucleus, leading to paralysis agitans. If it goes so far as degeneration and actual breaking down of the nucleus, then we have Wilson's disease.

Dr. Tom A. Williams, Washington, D. C.—Not until we know the pathogen causing the hepatic cirrhosis in progressive lenticular degeneration shall we be in a position to say whether we should exclude from this disease cases without hepatic involvement.

The specificity of the cerebral pathology can scarcely be affirmed yet in view of its resemblance to the lacunar disease described by Pierre Marie.

Those who have followed the changes of neurological opinion regarding new syndromes cannot fail to be struck by the diversity of those in the early stages of their study. But when wider knowledge is applied a synthesis of divers syn-

dromes is affected to form a coherent nosology usually on the basis of pathogenesis even when the actual pathogen is undiscovered. A conspicuous instance is that of the myopathies, of which early neurologists were accustomed to emphasize the different forms, which indeed were named after such students as Erb, Dejerine, Klumke, etc. Nowadays they are all grouped together into myopathic and myelopathic types much to the simplification of their understanding. The recent researches of Pieron and of Ramsey Hunt along with the study of the sequelae of encephalitis have greatly increased our range of knowledge concerning the striate body, and we may look to the eventual inclusion of Wilson's disease by a much larger group as soon as coordination of knowledge has been effected.

Dr. G. L. Echols, Milledgeville, Ga.—In all cases of neurological involvement there should be a study of the spinal fluid.

Dr. L. G. Beall, Black Mountain, N. C.—I should like to report a case which I had under my care during the past summer, which presents many of the symptoms mentioned by Dr. Graves as belonging to Wilson's disease. The patient is a male, aged 48. His father and mother were dead. He has one sister and two brothers living, and his family history is negative. The past history was uneventful, except that he has been unable to walk since early childhood and that the appendix had been removed about twenty years before. He showed increased tendon reflexes in both upper and lower extremities, bilateral spasticity in the arms and legs, more marked in the legs, bilateral Babinsky and bilateral ankle clonus. His arms were drawn to the side with the hands flexed on the wrist and were spastic. The liver extended about three fingerbreadths below the costal margin, was hard and nodular and somewhat tender. The pupillary reflexes were normal, and there was no nystagmus. The blood pressure was 190 systolic and 100 diastolic. He suffered from constant constipation. I did not make a diagnosis of lenticular degeneration because of the length of time that this condition has existed, nearly fifty years, and because of the absence of tremor of the face and hands. In spite of his handicap he has been most successful in business. He is the owner and editor of a newspaper and is a director of a bank and of a cotton mill, beside being a most successful farmer. He came under my care because of a mental depression. I should like to ask Dr. Graves if lenticular degeneration can exist for this length of time, and if it would leave the clear mental condition shown by this patient?

Dr. Graves (closing).—I never knew any of the members of this patient's family. She was the only child. Her father died at the age of 53, and her mother at 92. The patient had a normal mentality for an individual of her class, who had had no opportunity for an education.

The patient's disease remained stationary, or was very slowly progressive, until 1917. I believe it was in the latter part of this year that von Econimo reported his first case of a new disease and entitled it encephalitis lethargica. Very little further information upon the new infection was reported in the literature until it spread to France and England in the spring of 1918.

Kinnier Wilson made some exhaustive studies of the different phases of encephalitis from a thorough clinical study and post mortem disclosures of the disease as it occurred in England during 1918. This clarified very much our conception of the pathology and symptomatology of encephalitis lethargica or epidemica, but I do not consider progressive lenticular degeneration as originally described by Wilson to be in any way identical with encephalitis, although hemorrhagic exudation and degenerative changes may be largely confined to the basal nuclei.

My first case of encephalitis lethargica was seen in the latter part of 1919, and since that time I have seen a number of such cases as described by Drs. Block and Williams. I have seen a number of young people who presented a more or less typical Parkinson's syndrome. It has been present not only in young people but in those of middle age and even older. Real Parkinson's disease, usually occurring in from the fourth to the sixth decades of life, I have regarded as being due to degenerative changes in the basal nuclei, particularly in the globus pallidus, produced by some toxic or infective agent not yet identified.

Dr. Williams has asked me some questions which I cannot answer. The etiology and pathogenesis of this interesting disease described by Wilson, is wholly unknown. Various theories have been propounded, but so far as I am advised, the solution has not yet been reached. It has been said that a toxin generated in the liver has some selective affinity for the lenticular nuclei. It has been proposed, particularly by Jelliffe, that there was some relationship between the activity of the vegetative nervous system and the liver with subsequent degenerative changes in the lenticular nuclei. His discussion, however, does not give us a clear idea of the pathogenesis of hepatic and lenticular changes and he produces no proof of the theory he propounds.

Some American authors have reported cases of progressive lenticular degeneration without cirrhotic changes of the liver, but Wilson in his latest excellent article in "Oxford Medicine," Volume VI, rejects all cases not exhibiting hepatic as well as lenticular pathology. Disfunction of the liver has been suggested by others and a levulose test of the urine by Rausch and Schilder has been devised to attempt a solution of the hepatic difficulty. In my case herewith reported the levulose test did not reveal any disturbance of liver function. I am, therefore, unable to throw any further light upon the pathogenesis of the disease or the relationship between the sclerotic degeneration of the liver and the destructive changes occurring in the lenticular nuclei. So far as symptomatology is concerned in my case, I must content myself with calling attention to the tremors and general muscular hypertension and the deformity produced by contractures. The tremor and the muscular tension are always bilateral and invariably present, while deformity is always present but is not necessarily bilateral.

HYDROCHLORIC ACID IN GASTRO-INTESTINAL PATHOLOGY*

By J. C. Johnson, M.D.,
Atlanta, Ga.

During recent years so much interest has been manifested in the variations of gastric and intestinal secretions, and so much has been recorded about the reflex and other phenomena of the alimentary tract, that the abundance of our new knowledge threatens to become an obstacle instead of an aid to practice. And so it will become unless some means are devised to extract the useful and mix it with the common current of medical thought. Even when this is done its full value will not be realized until doctrinal education in gastro-enterology has been abandoned or revised. It has been taught that the motor functions of the stomach are more important than the secretory. This has led not only to neglect of fundamentals, but to operations which have not been necessary.

It has been taught that the majority of gastro-intestinal diseases are secondary, which would mean that both the motor and secretory functions are of secondary importance in the physiology of digestion, and that there is no primary gastro-intestinal pathology. The fallacy of these doctrines can be readily seen by any one with normal vision. The motor functions cannot be more important than the secretory for the simple reason that one cannot exist without the other, and if separate existence were possible, one would be useless without the other. If the majority of gastro-intestinal diseases are secondary, the processes of digestion are dependent upon other activities than those which are laboriously taught and learned in our schools, and by interpretation of which all professional effort is directed.

No one has attempted to prove these doctrines. They have simply been asserted and accepted by many. Any attempt to prove them would show only how lacking in common sense, to say nothing of scientific fidelity, they are. It is necessary to be convinced of this before we can profit more by the research work which has been done and which is being projected. When we have brushed aside the rubbish which has gathered before the facts of practical medicine and obstructed our view of diseases in their proper light, it will be found that the etiology of gastro-intestinal diseases, like the etiology of disease elsewhere in the body, is more intimately related to causes than to results, more a part of primary perversion than the product of secondary processes. If this is not so, this presentation should be concluded at this point, and all the data which has been published on this and allied subjects is not worth the paper it is printed upon.

Before we can be prepared to study intelligently or with any satisfaction any agent in the body as a potential factor in disease, we must answer several questions. First, what is the origin of this agent? Second, what is its function? Third, what is its relation to other agents? Fourth, what is its relation to other functions?

The first of these we shall pass, because on this point there is no disagreement. The second we shall ask in other words. How essential to digestion is hydrochloric acid? This we shall endeavor to answer by asking whether the amount secreted during digestion is just what is needed for that meal, and whether there is any fixed rule by which the proportion of hydrochloric acid to the balance of the gastric juice is determined, or whether its secretion controlled by the activity of the acid-secreting glands is to any degree independent of food and other sources of natural stimuli of the stomach. The fourth question we hope to answer in the body of the discussion, which will include also the questions which recently have received first and chief consideration by the profession. Is hydrochloric acid a constant or periodic secretion? What is the limit of normal variation? These latter two at once suggest the following: Do variations in secretion occur as the result of primary changes in the stomach or of changes elsewhere in the body?

If variations are not the result of primary changes in the stomach, what changes in the stomach result from variations?

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What effect do variations have upon other functions of the alimentary tract? Our answers to all these questions are based more upon experience than experiment. By experiment we have learned that while there are certain fixed laws which govern the physiology of secretion, the operation of these laws is modified by so many factors within and without the body that secretion and no other function are exactly the same in the same individual one day after another, notwithstanding that all functions may appear the same and the same measure of vital balance is seemingly preserved. For example, in a series of patients with similar and dissimilar disorders selected for the purpose of studying the effect of different foods, separately and in combination in these diseases, we found that one who started with hyperchlorhydria ended with no free acid.

Corresponding results have been observed in other experiments. Experience has taught us that each disease has a history of its own, and a pathology which, though other diseases may start it, yet is distinguished by characteristics which are not held in common, and which vary in a given disease in different individuals.

Achylia has the name but has not been accorded the nature of disease. We are all aware that with a continued total absence of hydrochloric acid some people seem to have good health. But this does not mean that the patient is as well off as he would be if he had hydrochloric acid.

Hydrochloric acid is the primary stimulus to the pancreatic secretion, and there is no compensatory action possible by which the pancreatic function can be perfectly and continuously performed without it. If hydrochloric acid is normally present in the stomach during digestion, then the absence of it is evidence of disease, and the cause of its absence is the primary cause of the disease.

According to all the rules and principles of physiology, the amount of hydrochloric acid secreted during digestion should be no more and no less than is needed for chymification of the particular amount and kind of food in the stomach, provided that its only purpose is chymification of the food. If more hydrochloric acid is secreted during digestion than is needed for chymification of the food, then it has other functions, or its excess is an evidence of disease.

Are the acid secreting glands capable of receiving stimuli to which other tissues of the stomach cannot respond? The answer to this question is very intimately related by ties of pathology to the question, is the secretion of hydrochloric acid constant or periodic? If it is normally constant, then its absence at any time is evidence of disease. If periodic, then its constant presence is evidence of disease. This would prove by its presence in the fasting state or the empty stomach that the acid secreting glands do receive stimuli to which the other tissues of the stomach do not respond. Our observations do not support this view, nor is it consistent with the laws of secretory activity common to all the glands of the body. Milk is secreted only during gestation. Saliva flows more freely during mastication. When free at other times it is due to some disease of the salivary glands or to some abnormal stimulus. The constant secretion of saliva has a manifest purpose. The constant secretion of hydrochloric acid would mean the same thing. If so, what?

If the amount of hydrochloric acid secreted during digestion is not determined by the character and amount of the meal, and is not influenced by other activities of the stomach, what is the normal limit of variation and by what means is this limit fixed? In some patients where free acid has been highest during digestion, it has been absent in the fasting state. In some in whom it has been normal during digestion, it has been as free during fasting. Here we have either two different physiologies or a physiology in the one and a pathology in the other. Or else we have a pathology in both. We have found that the presence of hydrochloric acid in the fasting state is usually associated with conditions characteristic of gastro-intestinal diseases. The value of experiments to show the constancy or periodicity of acid secretion is finally to be measured by our knowledge of its full purpose in the body. This knowledge will remain beyond our reach so long as we continue to move in a circle or stop when objectives disappear.

Hydrochloric acid is absent in the advanced stages of pellagra, tuberculosis, pernicious anemia and cancer. What kinship there is in the pathology of these diseases, we do not know. Their etiology is different. In morbid anatomy they have nothing in common. In each there is a grave constitutional depravity. It would, therefore, appear that the absence of hydrochloric acid in these diseases is secondary, and due to a metabolism peculiar to them all, in which the stomach shares, or to a toxemia which each disease produces. But this cannot be so, for the reason that in some cases of cancer and pellagra especially the secretion of hydrochloric acid persists to the fatal end, notwithstanding that other classical symptoms mark the progress of the disease.

This absence in some and presence in others cannot be explained by changes occurring in the stomach due to local causes alone. That would mean that the pathology of these diseases is the same. This is not true, nor, as we have stated, is there any similarity in their morbid anatomy even to the finest point of differentiation. There can be but one reasonable explanation, which if correct proves the intimacy between hydrochloric acid as a secretion and as an agent in the nutrition of the body. If our theories of its source are correct, there can be little doubt that in the diseases named there is either a primary disturbance of inorganic equilibrium as a cause, or a secondary disturbance of inorganic equilibrium as a result. In either event, hydrochloric acid as an agent in digestion assumes a greater importance than has been attached to it; for not only does it become a new index to the metabolism but a means of control of inorganic balance in the body by its union with salts in the food. Only a little reflection is needed to realize how great a part it may play in osmosis in the intestinal canal. It is at hand in regulating tension, sensibility, conductivity and motility, and for this reason often becomes a primary factor in diseases in which variations in these functions are a prominent feature. But it is not necessary to follow its action further than the stomach and duodenum to appreciate to what an extent this agent may have been overlooked in pathology.

If it is antiseptic, as is supposed, and we do not think that there is any doubt of this, why should the stomach be more susceptible to secondary infection than to primary, as is claimed? Why should bacteria pass through the stomach without inflicting harm and then return from some other organ full of powers, especially when the disease of the other organ is purely local and without known relation to digestion? If hydrochloric acid is antiseptic, it is as much for the benefit of the stomach as for the balance of the body, and more so if it can be proven that it is normally a constant secretion.

The secretion of hydrochloric acid is one of the natural sources of exercise of the stomach, and if it is normally a constant secretion, when absent it is the result of fatigue of the stomach. If not normally a constant secretion and if it is always present or being secreted, it will cause fatigue of the stomach. Hydrochloric acid is a stimulant to gastric secretion. In excess it is an irritant and may be the primary source of inflammation. It is likewise a stimulant to the muscular coat or its nerve supply, and in even periodic excess may and does often lead to myasthenia.

It is not only a local stimulant but a general stimulant primarily through the stomach, secondarily by reacting compounds. In several patients with myasthenia and low blood pressure the administration of normal dilution has produced within a few minutes an appreciable rise in pressure. In others, no effect was observed. In their very valuable contribution to the study of the mechanism of secretion in the upper alimentary tract, in speaking of the relation of carbon dioxid tension to acid secretion, Bennett and Dodd explain the discrepancy between alveolar carbon dioxid tension and the absence of obvious respirating effects in these words:

"Our belief is that the outpouring of acid by the stomach during digestion must tend to change the reaction of the blood, and that in order to avoid this consequence the body, through the agency of the respiratory center, causes a second acid, namely, carbonic acid, to be retained, the retention being shown by the increase of carbon dioxid tension in the alveolar air."

There is no doubt that the secretion of hydrochloric acid is attended by constitutional activity and is followed by con-

stitutional results each of which must be measured by estimate, not only of normal variation and curves of acidity, but by the total amount secreted. The fractional test meal of Rehfuss is exceedingly interesting from a physiological view, especially as it relates to time and circumstance, but the knowledge which we have gained by this method and that which may be possible, must be enlarged to comprehend the reason and the results of these variations and their relation to the other functions of the stomach and body before it can be fully appreciated or practically applied.

Reciprocal secretion is at the same time one of the most complex and effective functions of the body. And yet it is not possible without the independent capacity of each organ having part in this function. It cannot be perfect unless the primary function of each participating organ is perfect. This reciprocal action may be easily confused with reflex action, but it is more. It is possible that reflex action may influence hyperchlorhydria, or that gastro-succhorea may be increased by gallstones or appendicitis, but unless the primary functions of the stomach are controlled by other factors than their own, a variation in the gastric juice or any constituent thereof is not within the scope of any primary pathology other than of the stomach itself. The stomach does respond to stimuli from other sources than its own, but this response is reciprocal and is controlled by the associate functions of the stomach itself. So in its relation to diseases of the duodenum, liver or gall-bladder, the activity and state of the stomach is first to be taken into account. Reduced to the last analysis, the activity of the stomach, duodenum and liver separately and by reciprocity can only be expressed in terms of chemistry and physics. The sum of this activity is represented by the energy expended and reserved by each organ in doing its work. So after all, the relation of the stomach, duodenum and liver is subject first to the laws of pressure, whereon the positive pressure in each is regulated by the resistance formed by the tissues of each in the performance of its functions. It is very obvious that a change of pressure in either organ must inevitably affect its function, and be affected thereby, and that a superior pressure in one or the other must disturb reciprocal relation. In this manner excessive secretion of hydrochloric acid from any cause becomes the primary source of hypertension of the duodenum, gall-bladder and liver with all the possibilities incident thereto.

The Einhorn duodenal tube has given us a ready access to the duodenum and a means of proof of what was heretofore a presumptive fact, and Meltzer's contribution has brought the work in the duodenum to a point in practice where we can follow the activities of these reciprocal organs to a conclusion. So far as we know, nothing has been said about the primary agency of hydrochloric acid in diseases of the liver or gall-bladder especially. We have demonstrated that while magnesium sulphate encourages a flow of bile from the gall-bladder and from the liver, a free normal dilution of hydrochloric acid retards it, and an excess will check it when a flow by magnesium sulphate has been established. The practical suggestions of this are so evident that they do not deserve mention. Instead, I simply wish to express the opinion that gastro-intestinal pathology is like a long, long trail which starts somewhere, sometime, somehow. We cross this trail at various points and give these points a name. The trail goes on and is finally lost in a maze of highways and byways famous in scientific lore. One who stands at the beginning of this trail cannot see to the end. One who stands at the end cannot see to the beginning. Nevertheless, it is continuous, marked here and there by some event, some special circumstance, one leading to another and all combined to make development complete.

So if a true history of gastro-intestinal pathology could be written, it would bear record of minor elements as well as major objects, of a succession of perverted functions as well as organic crises, and massive changes, and as a primary agent in the original departure from the normal, there is none more potent than hydrochloric acid.

DISCUSSION

Dr. Elliott C. Prentiss, El Paso, Tex.—The question brought out here should indeed be the subject of very thorough research work. The

question of achylia and its results upon blood pressure would be very interesting if tested out with the administration of hydrochloric acid. In the few cases of achylia that I have had, the blood pressure has as a rule been sub-normal, even down to 85. Whether that was secondary to the absence of hydrochloric acid and due to toxemia, it is difficult to say. Right here I might say that the secretin is of course stimulated by hydrochloric acid, and where the acid is absent we might expect something wrong with the secretin production. That might explain the lowered blood pressure. Also in pancreatic cases, or where I was fairly sure the pancreas was affected, there was a low blood pressure, and generally in such cases there was either absence of hydrochloric acid or it was very low. So there might be something in that as a factor.

We all know that an obscure condition in the abdomen or elsewhere does frequently have an effect upon the hydrochloric acid secretion, and it is just possible that that may explain the increased acidity and the predisposition of the stomach to an irritated condition that it would not otherwise have. Also in gall tract infection sometimes there is an increase of hydrochloric acid, and that would tend to irritate the duodenum, and then also in addition to the increased acid we would get the abnormal bile going down which would add the factor of infection locally.

I believe the question of the interrelation of secretin and hydrochloric acid to the pancreas and blood pressure is of interest and worthy of note.

Dr. A. L. Levin, New Orleans, La.—I wish to say a few words in regard to the reciprocal relationship between hydrochloric acid and the gall-bladder, whether there is stimulation on the side of the hydrochloric acid in the production of bile, or vice versa. That point has been studied very carefully and experimental work has been done on animals. The activity was tested before removal of the gall-bladder; then the gall-bladder was removed; and the acidity was tested afterward. Marked sub-acidity and in some cases achylia was found. The same observations have been applied to human beings where the gall-bladder was removed for gastro-intestinal disturbances. I have carefully observed this phenomenon and I believe there is something in it; that the gall-bladder bears some relationship to the stimulation and production of hydrochloric acid. The surgeon's attention should be called to this. He should not remove the gall-bladder unless it is so diseased that it must be removed.

Dr. C. W. Roberts, Atlanta, Ga.—Of particular interest is this paper of Dr. Johnson's, bearing as it does on certain fundamental principles. I am not prepared by training to take issue with his deductions, if, indeed, they be subject to such attack. Rather would I commend the essayist for calling to our attention these very essential details upon which both gastro-enterologist and surgeon must build his effective superstructure, whether it be medical or surgical therapy.

Reference was made to the early resort, on the part of the surgeon, to removal of the gall-bladder, predicating the procedure on suspected disturbing gall-bladder pathology when the patient was really suffering from an essential, faulty, glandular sub-function. I doubt not that these mistakes are frequently made. This is a timely warning and is justified by over-enthusiasm in certain surgical quarters.

To pursue a little further the consideration of gall-bladder disturbances, no less an authority than William Mayo has said that "an ovary is either good enough to leave or bad enough to completely remove." I believe the surgeon would do well to heed a similar maxim concerning the gall-bladder. If it is sound enough to leave, possibly it should be drained by the Lyon method, which surely has to commend it less inherent dangers than surgical drainage which, by the very nature of the disease, cannot be curative. If, however, it is bad enough for any surgical attack, the procedure should be cholecystectomy.

These problems lie at the pivotal point of the whole question and will find their proper solution only as our various specialties are drawn by better understanding and a more sympathetic cooperation into that "concert of action" so feelingly referred to in the many public addresses of our illustrious ex-President.

Science admits of no equivocation. Those physicians among us who are seekers after the truth will neither sanction operation on gastric cases until the evidence is convincing, or permit unsound theories to lead us into ineffective therapeutic channels in that group of cases in which the brilliant achievements of modern surgery may play such a helpful part.

Dr. Daniel N. Silverman, New Orleans, La.—One of the fundamentals in the study of the physiology of the hydrochloric acid is an accurate determination of the real or active quantity of this acid secreted by the stomach. In a comparative study of the amount of hydrochloric acid in the gastric contents, I have titrated a great number of specimens and alongside this procedure used the colorimetric method as recently explained by Stohl, of Johns Hopkins. In a number of analyses the titration with Topfer's method would give traces of acid and sometimes degrees of subacidity while, as regards the true hydrochloric acid, the colorimeter would show that we were dealing with achlorhydrias. These observations in the use of indicators are certainly of importance if we are to rely upon our methods for the detection of the many physiological properties attributed to the hydrochloric acid secreted.

Dr. Marvin H. Smith, Jacksonville, Fla.—I wish to say a word concerning Dr. Johnson's paper, the last paragraph of which I feel has a far-reaching meaning. My interpretation of it is that every individual is traveling pathologically in some definite direction—that is in early childhood or adolescence he shows that he has inherited or has acquired certain states or conditions or attributes or habits which if permitted to continue undisturbed will surely and positively bring him the punishment of disease. The wise council of his physician usually is the interference, if there is any, that turns the tide and changes

the direction of his travel from fatal disease and destruction to the joys of robust health and long life. Many of the grave pathologies that lurk and unfold in the gastro-intestinal tract aside from the specific infections are undoubtedly traceable to innocent beginnings which appeared and continued many years before they were discoverable by our present methods.

I am firm in my belief that in time we shall be able, by carefully directed examinations periodically performed, to demonstrate that some of the fatal conditions of the stomach and bowels, lungs, liver, heart, pancreas and in fact most of the vital organs do exist while they are yet in curable states. Gastric analyses made yearly or semi-annually of an individual will establish certain variables and constants, which findings, when logically analyzed, will reveal the fatal line of travel and will enable us to prophesy with a remarkable degree of accuracy that this stomach or that pair of kidneys will, three or five years in the future, show a well defined, well recognized disease which today we are spending our time and energy trying to discover and which in many instances we are unable to benefit after the discovery is made. I predict that this idea, when worked out on a practical basis, will mean much to future medicine, although its development will necessarily be gradual.

The advanced cases of pyloric cancer today were potential carcinomas seven to ten years ago; the direction of travel could then probably have been changed, but it was not.

Dr. Johnson's presentation of this masterful paper has in a way knocked the wind out of my sails, because I had hoped soon to shape up a few thoughts on this subject and present them to the profession. However, the bitter taste of disappointment I shall convert into the sweet aroma of optimism and enthusiasm. But since his scholarly paper has not enumerated the details of this enormous subject, referring only briefly to the thought on which I have accumulated data for the past five years, I am encouraged to continue in anticipation of the time when I shall be able to convey the results of my labors to the brethren in classified form.

Dr. Johnson (closing).—Dr. Levin spoke about the secretions of the gall-bladder. I am convinced and believe I could cite thousands of cases showing that one of the most important sources of infection in the gall-bladder, and the changes that take place, is disturbance of hydrochloric acid. It may be diminished or increased, it may be constant or not, but I am convinced that any departure from normal secretion will interfere with the reciprocal relation of the duodenum and gall-bladder. You cannot have infection without first having something else, and you do not have infection until certain metabolic changes take place, and these changes do not take place until there is a loss of balance and resistance of the cells.

It is impossible for an organ to remain normal without normal exercise, and you may stop the normal exercise of the stomach by too rigid dieting or too much rest in bed. There are four great causes of disease: overworking an organ, underworking an organ, injury to an organ, or infection. We must get together on this point. We are moving very rapidly and there is no discrepancy of opinion between surgeons and internists. The surgeon simply sees the result, while the gastro-enterologist is supposed to stand at the starting point.

Dr. Prentiss spoke about achylia. I wish I could have said more about this. You can cure a number of cases of diarrhea by giving them nothing but hydrochloric acid. No patient can have absence of hydrochloric acid and be a well man.

I am glad Dr. Roberts spoke. I want to see the gastro-enterologist and the general practitioner stand at the natural starting point of all diseases, which are these processes which regulate the demand and control the supply of the body.

CLINICAL SIGNIFICANCE OF ABDOMINAL ADHESIONS*†

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No abdominal conditions are met with that offer greater difficulties in diagnosis and treatment and give more concern to the physician than adhesions. Such affections often either simulate or are associated with other organic disorders in the abdomen so that errors in diagnosis are not uncommon, and at times the symptoms noted may be so vague that the true condition is overlooked. In order to arrive, therefore, at proper conclusions regarding these intricate lesions, not only is it necessary to enter thoroughly into the clinical study of the patient, but every possible means of diagnosis must be utilized. No one can question the fact that extensive adhesions exist at times without causing any symptoms, whereas limited adhesions are seen occasionally, producing serious manifestations and even leading to obstructions. It is also interesting, too, to note as it not uncommonly occurs,

*From the Gastro-Enterological Clinic of the Medical Department of the University of Maryland.

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in individuals with marked adhesions who have suffered much distress, how Nature will accommodate herself to the malformations caused by such adhesions, so that the normal functional activity of the gastro-intestinal tract may be re-established without further undue discomfort to the patient.

It is well known that one of the most striking characteristics of the peritoneum is the rapidity with which it can form adhesions. Equally characteristic is its ability to absorb adhesions and as completely to remove all traces of their previous existence. It is not known definitely why some adhesions persist and others disappear, but perhaps this may depend upon whether the causative agent has or has not destroyed the endothelium. Adhesions occur usually as a result of infection or following operative procedures.

According to MacCallum but little is known regarding peritoneal inflammations produced by non-bacterial factors. Bacterial invasion may be brought about through the blood stream, by growth from the peritoneal wall, or through perforations from organs lying in the abdominal cavity. The organisms most frequently encountered are the pyogenic and colon bacilli. At times there are also found the tubercle bacillus, gonococcus, etc.

The inflammation may be confined to a small area appearing in the fibrinous or fibrino-purulent state, gluing together opposing surfaces and being replaced by fibrous adhesions and thus preventing further spread of infection, or the adhesions may be very extensive, covering a large area of the abdominal cavity. These may appear quickly or develop slowly, depending largely upon the virulence of the organisms at hand, and upon the resistance of the tissue involved.

The partial form, limited to circumscribed areas, is most common and is associated with the usual forms of adhesions giving rise to a variety of disturbances in the abdominal cavity. Localized adhesions may be caused by former attacks of acute or subacute peritonitis. Following the absorption of the exudate the adhesions remain as fine or thick cords or bands, or as simple cicatricial thickenings or masses. Recovery following operation in purulent inflammation in the abdomen always takes place by the formation of adhesions. While encysted purulent peritonitis produces this formation from the onset, indeed adhesions are frequently formed from non-suppurative, localized, acute peritoneal inflammations. There are forms of chronic peritonitis, however, in which the etiology is rather obscure, in which the onset is gradual and insidious. Adhesions are also commonly observed in cases of ulcerations in malignant disease of the stomach or any part of the intestines in chronic intussusceptions; in intestinal strictures; in diseases of the liver and gall-bladder; and at times after long-continued external trauma.

The formation of adhesions following abdominal operations is well known. They frequently form serious complications.

Localized adhesions are often present without producing clinical manifestations, especially in certain positions, as on the surface of such organs as the liver or spleen. On the other hand, even very limited forms may lead to the development of serious anatomic changes. By means of connecting bands with the various abdominal organs, displacements, fissures, constrictions, kinks and angulations of the intestines may be produced. For example, the omentum may become adherent to the abdominal wall, abdominal or pelvic organs or intestines producing mild or severe symptoms according to the degree of functional disturbances occasioned in these organs. Or, again, the mesenteric adhesions may lead to shortening of the intestine and in consequence serious disturbances of function and interference with the permeability of the bowel may be produced. In this connection, attention may be called to the well-known forms of localized adhesions commonly known as Lane's kinks, which are in close proximity to the ileocecal valve and Jackson's membrane of pericolonic origin. In rare instances the localized adhering and matting together with the inflammatory exudate may produce a palpable mass.

SYMPTOMATOLOGY

Adhesions not infrequently occasion no symptoms whatever. At times they may even produce a beneficial effect, guarding against danger by interfering with the extension of a serious lesion. The formation

of adhesions in cases of gastric ulcer or surrounding abscesses in many instances is conservative, serving to prevent perforations or to limit extravasation if perforation occurs.

However, very pronounced symptoms are frequently produced by adhesions, giving rise to manifestations which at times simulate other conditions, such as cholelithiasis, ulcers, etc. Not uncommonly the symptoms occasioned are extremely obscure, and the true condition may be quite difficult to determine.

The symptoms manifested by adhesions are frequently produced by mechanical interference. By means of attachments to various organs the normal movements are interfered with, and the shape or position of the organs is thereby altered. In this manner the symptoms may be due to these mechanical factors leading to discomfort or pain due to dragging or pulling or to disturbances of function which interfere with the normal peristalsis and lead frequently to partial or even to complete obstructions. The symptoms arise as a rule more quickly and severely if the adhesions be associated with movable organs, while when connected with less movable ones, they appear more slowly. On the other hand, the movability of the organs and the locations of the attachment are of greater significance than the extent of the adhesions. The diagnosis of adhesions is made by means of the symptoms already alluded to: from the history of the attacks, previous acute inflammatory conditions in the abdomen, and with the roentgen ray signs by means of which hitherto undetected forms of this condition can now be definitely determined.

As a matter of convenience abdominal adhesions may be classified as follows: (1) perigastric, (2) pericholecystitic, (3) perisplenitic, (4) intestinal, and (5) pelvic.

Perigastric adhesions may occur localized over a small area of the stomach or may be very extensive, the stomach being adherent over its entire surface. When localized, certain areas of the stomach may be especially involved, the cardia, pylorus or fundus.

This condition may develop as the result of ulceration in two forms: first, as rather loose adhesions involving the stomach and neighboring organs on account of which the stomach is subjected to traction; and, second, as dense bands of tumor-like character formed by gradual growth toward the surface in consequence of which short but firm adhesions may bind the stomach to the peritoneum or neighboring organs.

In addition to the gastric and duodenal ulcerations, perigastric adhesions may be produced by gall-stones, malignant disease, pancreatic disease, umbilical and epigastric hernia, traumatism and at times from tuberculosis and syphilis. The adhesions involve most frequently the colon, liver, spleen, pancreas and occasionally the anterior abdominal wall. The adhesions binding the liver and pancreas are usually broad and firm, while those attached to the colon and gall-bladder are long. In consequence of the formation the contour of the stomach may become greatly altered, the pylorus being narrowed; or the stomach may even be divided into two parts. Furthermore, its motility may become markedly interfered with. The importance of perigastric adhesions in the production of symptoms is not at all times an easily determined matter. Whenever symptoms occur or recur following operations, the cause is ordinarily attributed to this condition. There may be no positive evidence for this assumption except that adhesions are known frequently to follow operative procedures in the abdomen.

The symptoms may be due to recurrence or continuance of the ulceration or to traction from the scar. Frequently the symptoms are purely neurasthenic in character and in no way associated with the operation except in so far as this procedure has occasioned nervous exhaustion. On the other hand, even though the stomach be adherent over its entire surface, the symptoms may be insignificant, there being little discomfort other than a feeling of fullness in the epigastrium after small meals.

Localized adhesions may or may not give rise to distressing symptoms. They, however, lead frequently to sharp kinking of the pylorus or duodenum, thus producing a degree of obstruction by narrowing the lumen. The adhesions may cause pain of great severity when traction is

produced upon them, when the stomach is distended with food, or on movements of the body as in walking or in exercise. Violent exertion is frequently the immediate cause of severe forms in these cases. Adhesions on the lesser curvature binding the stomach to the pancreas or left lobe of the liver produce severe pain radiating into the back and shoulder which is relieved in the recumbent posture, and increased in the upright position. In some instances of this kind, according to Stockton, hyperesthesia of the adjacent left intercostal nerves is manifested. These adhesions frequently result in disturbing the gastric motility, even though there be no tendency to the production of a stenosis of the pylorus.

When adhesions are dense and become localized, tumor formation may be produced. This process may extend over a number of years, the growth being gradual, and the mass may finally become adherent to the abdominal wall. It occasionally happens that such masses may be palpated in the left epigastric region or in the region of the pylorus, producing on palpation the appearance of a malignant growth. Malignancy cannot always be excluded until after an extensive period of observation. In such instances, vomiting is usually present in addition to the usual symptoms of pain and disturbances of motility.

In the hour-glass stomach produced by perigastric adhesions, there is usually a long history of symptoms characteristic of peptic ulcer or cholelithiasis. Pain is a prominent symptom which is usually localized and is not dependent upon food, but is rather influenced by the position of the patient and is greatly increased upon violent exertion. The pain is at times relieved by pressure. When fluid is introduced into the stomach through the stomach tube, a ballooning of one portion of the stomach is produced, this swelling suddenly after a gurgling sound subsides, upon which the ballooning is manifested at another portion of the stomach.

Perigastric adhesions having their origin in the stomach may spread in the direction of the liver, producing symptoms much like those of cholelithiasis. The pain may be severe and aggravated by food and exercise, and there may be tenderness under the right costal arch. At times the pain is paroxysmal and resembles biliary colic so closely that the diagnosis of cholelithiasis is made until at operation the true condition is revealed.

The following case illustrates the condition:

Mrs. W. T., age 34, had been complaining of acute abdominal pains appearing at irregular intervals. These pains began under the right costal arch and radiated back to the right shoulder blade. They were extremely violent, and at times required morphin for relief. There was nausea and vomiting following the attacks, but no fever, chills or jaundice. On examination, the edge of the liver was just palpable, and was exquisitely tender on pressure. The diagnosis of cholelithiasis was made, but at operation a band of adhesions was found having its origin in an old duodenal ulcer, and adhering to the gall-bladder. There was no evidence whatever of gall-bladder disease.

Caldwell has called attention to a special train of symptoms due to perigastric or duodenal adhesions in which the pain appears in one-half hour or more after meals and gives rise to symptoms much like those observed in duodenal ulcer. In these cases the adhesions frequently extend from the duodenum to neighboring organs. The pain is frequently of a dragging character, aggravated by exertion and relieved by pressure. Gastro-colic adhesions occur at times, due to ulcer or carcinoma of the stomach, which may produce stenosis of the transverse colon and intestinal obstruction. Boweret has especially called attention to this condition.

The diagnosis of perigastric adhesions is often difficult. The history is always of great importance. The character and location of the pain and its relation to food and exercise must always be taken into consideration. It must be remembered that adhesions from gastric ulcer are not uncommon. Caldwell finds that they are present in 40 per cent of cases of this disease. When the symptoms are due entirely to adhesions, the pain is apt to be constant and of long duration and not definitely related to the ingestion of food. The situation of the adhesions will in a measure also influence the symptoms.

Of the greatest importance in the diagnosis of this condition are the signs revealed by means of fluoroscopy and the x-ray. By such examinations one is en-

abled to determine not only the presence, but also the extent of perigastric adhesions. However, at times complicating factors may obscure the presence of these signs. Such conditions may exist in the form of large, indurated, ulcerative lesions in the stomach itself, or the findings may apparently be due to purely reflex conditions or spasm.

It is also necessary at times in a certain proportion of cases in which adhesions of the stomach are revealed by means of the roentgen ray to lay special stress upon the clinical history of the case before the final decision is made. If the clinical signs coincide with a definite history of ulcer, we must conclude that the adhesions have taken their origin from an ulcer. If, with a history of cholelithiasis, they are probably from the gall-bladder. From a roentgenological point of view the appearances are frequently identical. In 9 per cent of our ulcer cases, the diagnosis was rendered doubtful by the presence of adhesions. When adhesions are situated at or near the pylorus, important aid is rendered in diagnosis by the presence of obstructive signs which are not only revealed by the x-ray examination but also by clinical methods. In many instances the obstruction may be only partial and it is only by means of the x-ray that this condition can be definitely determined.

In the treatment of perigastric adhesions, attention should be directed to the early diagnosis of gastric ulcer, which is a most frequent cause of this condition. The earlier an ulceration heals the less likely is the formation of adhesions. When the diagnosis of perigastric adhesions is definitely arrived at, surgical intervention is indicated, provided the symptoms are sufficiently urgent to demand radical relief. Whenever obstructive symptoms are present operation is indicated without delay. However, when obstruction is not present one must hesitate to advise operation unless the pain and discomfort are excessive and disabling. Operation is frequently followed by a recurrence of the adhesions which may lead to more marked discomfort and distress than that which was originally present.

PERICHOLECYSTITIC ADHESIONS

Pericholecystitic adhesions are usually the result of inflammatory procedures in the gall-bladder wall involving the peritoneal layer. At times extrinsic causes may occasion this condition. The causes of this affection, in addition to cholecystitis, are usually malignancy of the gall-bladder or ulceration of the duodenum, stomach and colon. It is a well-established fact that extensive pericholecystitic adhesions may occur very quickly; or they may develop slowly over a long period of time.

According to Smithies, pericholecystitic adhesions arising primarily from the gall-bladder occur in about 48 per cent of cases of gall-bladder disease. These adhesions may involve all adjacent or even distant structures in dense bands such as the bile ducts, duodenum, pylorus, stomach, omentum, colon, liver, and pancreas. These frequently become infected and represent bands through which bacteria may be transmitted in organs far away from the gall-bladder region. In about 40 per cent of these cases gall-stones are present, while, according to Smithies, gall-bladders free of stones are adherent to adjacent organs twice as frequently as those in which stones are observed.

Smithies points out that the following conditions may ensue as the result of pericholecystitic adhesions:

(1) Perforation of the gall-bladder with extensive adhesions.

(2) Adhesions between the gall-bladder, duodenum or pylorus, producing stenosis of the pylorus.

(3) Fistula between the gall-bladder and duodenum.

(4) Interferences with the emptying of the gall-bladder due to the angulation of the ducts.

(5) Adhesions to the colon which is held and pulled up.

Mayo, Robson, Tuffier and Maschiavs, as well as others, have called attention to pyloric and intestinal obstructions due to pericholecystitic adhesions.

In many instances these cases resemble carcinoma of the pylorus. They may lead to kinking, strangulation and even acute obstruction of the bowels. Niles has called attention to an instance in which a stenosis of the hepatic flexure of the colon was due

to this cause. At times adhesions take place between the gall-bladder and appendix, giving rise to symptoms which make it difficult to determine which is the primary affection.

It must be remembered, on the other hand, that pericholecystitic adhesions may arise from the liver itself, the direct result of mechanical pressure. The so-called corset liver may be the cause of this condition (perihepatitis). Of considerable importance is the chronic thickening of the peritoneum over a large surface of the liver as the result of intestinal hepatitis in cirrhosis or syphilis.

The symptoms produced by chronic pericholecystitic adhesions vary much according to the extent of the adhesions and the structures involved. Inasmuch as this condition is frequently due to cholelithiasis, the usual symptoms of gall-stones are noted and the adhesions may not be detected until the time of operation. As a rule they give rise to years of pain and discomfort. The pain may be continuous and severe and may be increased by food, intestinal peristalsis and active exercise. There is frequently marked tenderness under the right costal arch, and, according to Boas, tender areas are noted in the axillary, scapulary and posterior median lines to the right in this affection.

In other cases, the pain may be paroxsymal, notwithstanding the absence of gallstones. It may resemble biliary colic so markedly that operation may be performed for this condition, at which the true nature of the affection is revealed. The pain may not be intense and may give place to a feeling of distention and pressure. There is frequently a dragging, full feeling, mainly after food, and at night. In addition to the pain and fullness, nausea and vomiting are frequent and constipation is usually present. Whenever the common duct is at all involved jaundice is apt to occur with the appearance of clay-colored stools. Test meals usually reveal a tendency to hypochlorhydria and on fractional analyses it is not unusual to find a true achylia, though at times high acidities are obtained. Blood is absent in the test meals and in the stools.

Of great importance in the diagnosis of gall-bladder adhesions are the roentgen ray findings. These indications are revealed by the presence of adhesions dragging the stomach and duodenum over into the direction of the gall-bladder. They may extend to various points of the intestinal tract, pulling up the hepatic flexure, and are apt to produce varying degrees of stasis, retention and obstruction according to their extent and thus to give us a definite picture in the plates as to the chronicity of the gall-bladder adhesions. Frequently this condition is associated with a filling defect in the duodenum and a deformity of the duodenal cap. When this condition arises it is at times impossible to determine whether we are dealing with a primary gall-bladder or duodenal disease, and it is only possible by a study of the clinical history that a correct diagnosis can be made. In those instances in which the underlying cause is cholelithiasis, gallstones may be demonstrated in a certain proportion of cases. When pyloric obstruction occurs in pericholecystitic adhesions, a deformity of the stomach is produced with an interruption of the normal peristalsis, producing pylorospasm with an escape of little bismuth. When this condition is marked, the roentgen ray will reveal a sixteen- or eighteen-hour retention of bismuth.

The diagnosis of pericholecystitic adhesions is not always simple. A careful study of the clinical history of the case, with the roentgen ray findings, however, may lead to the correct diagnosis. The difficulties arise in the differentiation of this condition from cholelithiasis, duodenal ulceration, chronic appendicitis, and at times the gastric crises of tabes. The history of a previous abdominal operation will at times clear up the diagnosis.

The difficulties in diagnosis of these cases was demonstrated in the following case:

R. A. B., age 46, had been perfectly well up to six weeks before he sought medical advice. He suddenly began having nausea and vomiting, and at times vomited food eaten the day previously. He did not complain of abdominal pain. He had not been jaundiced and he had no fever. He began to be emaciated and was extremely weak. On physical examination the abdomen was observed to be very much distended and peristaltic movements were marked. His gastric secretion showed a total achylia with a total acidity of 35 and a marked retention. The Wassermann reac-

tion was negative. An x-ray examination revealed an eighteen-hour retention with a marked filling defect at the pylorus. A diagnosis of carcinoma with pyloric obstruction was made. At operation a much dilated stomach was revealed with gall-stones and adhesions extending from the gall-bladder to the pylorus and encircling it to such a degree as to cause obstruction.

In the treatment of this condition operation must always be considered. If a previous operation has not been performed, it is usually a simple matter to loosen up adhesions and if a cholecystitis or cholelithiasis exists, at the same time to perform a cholecystectomy or cholecystostomy. However, if a previous operation has been performed, the question of a second operation should be most carefully considered. Unless urgent symptoms arise such as intense pain or signs of obstruction, operation should be withheld for fear of recurrence of adhesions which may be more extensive than those which existed previous to operation. We often see patients operated upon many times for adhesions of this character, who subsequently are found in far worse condition.

PERISPLENITIC ADHESIONS

Chronic inflammation of the peritoneum covering the spleen is not uncommon. It leads frequently to the production of adhesions to the stomach, intestines, diaphragm and abdominal wall. This condition may be localized or diffuse. The localized form is observed in connection with infarcts or new growths of the spleen, while the diffuse form is found in chronic splenic enlargements as in leukemia, lymphadenoma and malaria.

The diagnosis of this affection is usually readily established by the recognition of the enlargement of the spleen with pain and the tenderness on palpation and the blood findings.

INTESTINAL ADHESIONS

The importance of intestinal adhesions as a causative factor in the production of many obscure abdominal symptoms is now well recognized. Virchow pointed out, in 1853, the frequent occurrence of this condition. He attracted attention to its appearance especially in the region of the hepatic and splenic flexure, where adhesions are formed on the one hand between the hepatic flexure and the gall-bladder and liver, pylorus or omentum, and on the other between the splenic flexure and the spleen or omentum. At autopsy, Virchow found the condition of localized chronic peritonitis so frequent that there seemed to be difficulty in obtaining bodies in which the normal relation of the peritoneum existed. He concluded that this condition was at times produced by trauma upon the abdomen, but it occurred usually as a result of the spread of inflammation from the hollow abdominal viscera. On the other hand, he traced its origin in some instances to the hard fecal masses in the colon, especially in the cecum, and flexures producing a mechanical irritation without seriously injuring the mucous membrane.

Since Virchow's time attention has been attracted to adhesions as the cause of many obscure abdominal symptoms. Lane has especially pointed out that abdominal adhesions are an important causative agent in the production of constipation. They lead to obstruction of varying degrees from dislocation, narrowing of the lumen of the bowel, and kinking. The term Lane's kink points to a band in the terminal ileum in its last four inches produced by a prolapse of the bowel with adhesion in this area. Kinks are frequently found in other locations.

The fibrous adhesions are either very delicate and thin or coarse and thick, forming masses of fibrous tissue. These dense adhesions may be adherent to other loops of the intestine, to the abdominal wall or other structures, and the loops of intestine may be so finely matted together that it is with difficulty that the contents are enabled to pass through the bowel. The omentum and intestines are usually involved and are often thickened, contracted and bound down. Frequently, due to the retraction of the intestines and omentum, the intestinal canal is shortened, and the whole peritoneal cavity may become almost obliterated.

Adhesions may develop in many parts of the abdomen and thus the most distant points of the peritoneal cavity may become firmly connected with each other. According to Treves, "There is hardly any conceivable combination of adhesions which has not been met with." He has well described the anatomic conditions responsi-

ble for the formation of adhesions between structures which are distant in the abdominal cavity. These adhesions have been noted between the cecum and sigmoid flexure, colon and uterus, ascending colon and ovaries. They can only occur provided the parts involved are displaced in abnormal positions. There is little question that in many instances the intestine is greatly distended with gas when the adhesive peritonitis develops, and thus structures normally distant from each other become united. Attention must always be drawn to the fact that hernia, either umbilical or inguinal, may lead to intestinal adhesions of a very severe type.

Diseases of the intestines are the most prolific cause of abdominal adhesions. Of these, affections of the appendix occupy first place, leading from the mildest to the development of the very severe forms of adhesions. Ulcers of the intestines follow next in importance to diseases of the appendix. Among these may be included duodenal ulcer, already alluded to, typhoid, tuberculosis and syphilitic ulcers. Some forms of ulceration tend to perforate more readily than others, leaving little time for the formation of protective adhesions. Others have a tendency to perforate; and when perforation does occur, it is usually within a localized portion of the peritoneal cavity with the formation of marked adhesions. Due to the ulcerative process there may be a simple peritoneal thickening with the formation of adhesions to neighboring structures. In tuberculous ulcerations this thickening is usually infiltrated with tubercles forming at times by a matting together of peritoneum, omentum and intestine, a definite abdominal tumor.

Carcinoma of the bowel may lead to adhesions beginning in the serous coat of the portion of the bowel affected. The process extends with adhesions to adjacent organs.

Jackson has called attention to a membranous colitis affecting especially the hepatic flexure and extending over the cecum and ascending colon. Inasmuch as adhesions are extremely frequent in association with the intestine, there can be little question that they may be present without producing symptoms. On the other hand, it is a well known fact that even moderate forms may lead to most serious manifestations. From the investigation of Mollison and Cameron, it has been established as a result of fifty consecutive autopsies at Guy's Hospital in individuals from three weeks to sixty-eight years that adhesions were present in all adults and older children, and in eleven of the seventeen children under five years. They were found most frequently associated with the large bowel. The small intestine was seldom involved except the last terminal portion of the ileum. They were found in association with the cecum and appendix.

In some forms of dysentery the peritoneal coat covering the bowel may become involved, leading to adhesions of a more or less severe type. Again various angulations may occur in the bowel as a result of enteroptosis, in which adhesions are very apt to form, holding the bowel in certain positions, producing varying degrees of stasis and obstruction.

Attention must be called to a chronic mesenteritis of the sigmoid flexure as well as to the contraction of the mesentery of the cecum and lower end of the ileum. Radiating adhesions of the mesosigmoid may even cause a volvulus of the sigmoid flexure.

External trauma, especially if long continued or frequently repeated, may also produce a localized chronic peritonitis with the formation of intestinal adhesions. It has been demonstrated that severe blows on the abdomen have frequently led to adhesions which may first appear long after the injury.

Finally, attention must especially be drawn to the fact that intestinal adhesions are exceedingly apt to occur after abdominal operations, and that they are frequently the cause of serious complications.

The symptoms of intestinal adhesions are extremely important. The most usual effect of these conditions is a tendency to the formation of constrictions and kinking of the bowel, which leads to serious interference with the permeability of the lumen and tends to the production of stenoses. In addition intestinal obstruction may take place by the strangulation of cords or bands of adhesions. It is important to note that the symptoms are often entirely out of proportion to the changes in the

peritoneum. In some instances very extensive adhesions give rise to very few symptoms, while on the other hand a slight circumscribed peritonitis may lead to an almost complete obstruction of the bowel.

The following symptoms are most prominently observed in the presence of intestinal adhesions: more or less abdominal pain, severe or mild and constantly observed in either side of the lower abdomen, usually increased immediately preceding a bowel movement; violent attacks of pain in the left side, especially with the evacuation of formed stools; chronic constipation; and pain on exercise even of the mildest character. When obstruction is produced the clinical signs are typical of this condition. In addition, in many instances of intestinal adhesions a rather marked intestinal toxemia is noted, due to the intestinal stasis, causing nausea, vomiting, headaches, exhaustion and weakness. Many neurasthenic symptoms are apt to arise which frequently are so marked that the primary conditions may be overlooked for a long time.

In those instances in which pericolonic membranes are found symptoms may be entirely absent in a large proportion of cases. However, in a certain group one does observe a discomfort or pain in the right iliac region with tenderness in this area. This tenderness may be increased by errors in diet and by exercise. There is frequently gaseous distension and gastric symptoms are not uncommon. Cecal stasis is present, due to interference with the peristalsis.

Rolleston has described cases of localized adhesions in connection with the descending colon (pericolitis sinistra) which apparently are due to ulcerations of sacculi or "false diverticula," containing fecal concretions. The clinical signs are those of appendicitis on the left side.

Adhesions associated with the sigmoid are not uncommon. These may arise as a result of a chronic catarrhal condition of this structure. As a result, portions of the bowel are bound down, sometimes constricting the lumen of the sigmoid. This may induce severe constipation with mucus surrounding the hard, flat or pencil-shaped fecal masses. There may be more or less discomfort in the left iliac region with frequent discharges of mucus and often colic at the time of the passage of the stools. At times a sausage-shaped tumor is produced by the condition, which is usually fixed and adherent.

On proctoscopic examination the sigmoid is found dilated and sacculated, and often acutely fixed and adherent.

In association with various forms of diverticulations a peridiverticulitis is produced with adhesions to the surrounding structures. Of these, the group associated with infections is most important. It produces a peritonitis with abscess formation or binds the diverticulum to the neighboring intestine. In another group, due to the adhesions and angulations, a serious form of obstruction manifests itself with tumor formation, which often stimulates carcinoma. The symptoms of these conditions are noted as pain on the left side with the formation of an inflammatory tumor. They often resemble a left-sided appendicitis, with the signs of intestinal obstruction, due to the adhesions narrowing the involved portion of the bowel.

In the diagnosis of intestinal adhesions no better method of study is afforded than the x-ray, which reveals displacement, distension, constriction and immobility of parts of the bowel caused by the adhesions. When the bismuth meal is taken it ordinarily reaches the cecum in from seven to ten hours, the transverse colon in twelve hours, and the sigmoid and rectum in eighteen to twenty hours. Delay in the passage of the bismuth may be due to various conditions and especially to adhesions in various portions of the intestinal tract, including the gall-bladder region, cecal region, splenic or hepatic flexure or sigmoid. Any of these conditions may lead to chronic constipation, and at times in certain instances to actual obstruction. All cases of chronic constipation must be carefully studied by means of the x-ray, and in many instances the cause becomes apparent. In some the adhesions are so marked and extensive as to account definitely for the condition. Attention must be called to the angulation and kinks occurring in the lower right quadrant due to adhesions which are usually readily recognized by the x-ray. The adhesions may not, however, be limited to the appendix, but may be associated with the cecum

at times. They may cause marked fixation of this portion to the intestine or may even be connected with the ascending colon or the cecum, causing varying degrees of obstruction, or may be due to pelvic inflammatory conditions which produce a similar effect. In fact, the terminal portion of the ileum is a common seat for the formation of adhesions. At operation, one frequently finds in cases of chronic appendicitis that the appendix itself is perfectly free and no adhesions are found around the cecum. But the terminal ileum appears fixed so that the ileum beneath the kink becomes dilated and at times almost obstructed.

Constrictions of the bowel may be temporary or permanent. The temporary constrictions may be due to kinks, intussusception or volvulus. The permanent constrictions are due to adhesions or malignant growths. Adhesions producing intestinal obstructions are observed almost at any portion of the intestinal canal. They are most frequent, however, in the second and terminal portions of the duodenum, first portion of the jejunum, the terminal portion of the ileum, the hepatic, splenic and sigmoid flexures.

Attention must be called to a membrane which is frequently found to encircle the ascending and transverse colon, known as the pericolonic, or Jackson's membrane. This thin veil arising from the posterior lateral abdominal wall on the right covers the ascending and transverse colon very loosely, the cecum being free. In most instances it produces no symptoms. At times, however, x-ray evidences are revealed in the form of cecal stasis or moderate obstruction due to the narrowing of the bowel by the veil.

Constrictions due to intestinal adhesions are usually extensive and are frequently associated with folds of the bowel, or they may produce actual kinks without obliteration of the lumen of the bowel. These conditions can usually be determined, according to Pfahler, by manipulating the bowel until it becomes completely distended after a temporary obstruction. When associated with constrictions, the bowel is likely to be drawn out of position or fixed. Twists in the bowels with adhesions are most usual in individuals with an elongated colon and are frequently associated with an enteroptosis. Such involvement can be best determined by means of the bismuth enemata. Of interest in this connection is the so-called long sigmoid loop, which may become twisted on itself with the formation of adhesions and give rise to symptoms of obstruction. Pfahler has called special attention to this condition from a roentgenological point of view. Adhesions extending from the sigmoid can be easily determined by means of bismuth enemata. The sigmoid is fixed and other portions of the intestine are pulled toward it. In an instance in our experience the cecum was plastered against the sigmoid a few months following a pelvic operation and formed adhesions to such an extent as to occasion an obstruction, which was finally relieved by operation.

Diverticulitis of the large bowel with adhesions may be detected with little difficulty by means of the x-ray. One observes in this affection that the diverticula are filled with bismuth for days following the administration of the enema.

All of these conditions can easily be determined by the delay in the passage of the bismuth which will be revealed in the plates and by means of the fluoroscope. Inasmuch as adhesions are detected by changes and delays in motility, great care must be exercised in drawing conclusions regarding these findings. At the same time we cannot help being impressed with the frequency with which adhesions are formed and obstructions produced. In this day of operative surgery such cases are quite commonly observed. We are frequently amazed to see how Nature will accommodate itself to the malformations caused by such adhesions. In the roentgen ray study of intestinal adhesions and angulations bismuth enemata are utilized to the greatest advantage.

Extensive intestinal adhesions cannot be benefited by any medical form of treatment, and the results of surgical intervention are not always brilliant. On account of the intense pain and discomfort with tendencies to partial obstruction, many patients urge operation and at times the results are exceedingly gratifying. At times the exploration reveals adhesions far more extensive than was anticipated, and not remediable by operation, while

at other times the separation of adhesions or a single division of a band has brought about the greatest comfort and relief. It may become necessary at times on account of obstructive conditions to perform extensive resections and anastomoses as life-saving measures.

On account of the danger of recurrences of intestinal adhesions following abdominal operations, often more extensive and serious than before such procedures, it may become more expedient at times to treat cases of intestinal adhesions medically. The medical treatment consists largely in the relief of the underlying toxemia. For this reason the patient should be placed upon a carefully regulated diet, so far as possible free from harsh, irritating food, medicated stupes should be applied to the abdomen, and mild abdominal massage should be practiced and the bowels regulated by means of mineral oil, agar agar, or small doses of castor oil given several times daily. In quite a number of cases under our care duodenal lavage with Ringer's solution or magnesium and sodium sulphate has afforded great relief.

In a recent contribution, Behan suggests prophylactic measures regarding the formation of adhesions. He claims that a heated paste of 5 per cent of boric acid in pure lanolin properly sterilized and heated until it is absolutely fluid, when applied to the peritoneal surface inhibits adhesive formation. However, it is only useful where no inflammatory reaction is present. There is also marked relief of post-operative pain and for this reason alone he urges the use of this method. The avoidance of unnecessary trauma and frequent change of position, stimulation of peristalsis by means of drugs, eserin salts, strychnia, etc., early relief of tympanites, heat to the abdomen and diathermia are some of the prophylatic measures recommended.

PELVIC ADHESIONS

The female genital organs are of the greatest importance in the production of pelvic adhesions, while in the male the sexual organs are of little importance in this respect. In the female the pelvic organs give rise very frequently to pelvic adhesions, due first to the fact that in parturition by injury a ready means for the entrance of micro-organisms is opened into the peritoneum and may cause pelvic peritonitis. Many cases of pelvic peritonitis are produced by gonorrheal infection. Gonorrheal endometritis follows a primary infection of the external genitals and spreads through the tubes to the pelvic peritoneum. The peritonitis may be very acute, but usually it is chronic with frequent acute exacerbations. If the disease progresses, adhesions form, uniting the posterior surfaces of the adnexa and the uterus with the rectum and sigmoid or other portions of the bowel that may have prolapsed into the pelvis. The action of the adhesions is protective in character and prevents the spread of the infection above the brim of the pelvis. Adhesions of gonorrheal origin grow dense and tougher with time and serious displacement of organs may result. Puerperal sepsis is at times followed by the formation of pelvic adhesions. Since the causative organism is the streptococcus, protective adhesions are not usually formed. The germ is too virulent, and the spread of the infection too rapid. The general abdominal cavity may become involved, causing a diffuse peritonitis, and death. Another very common form of pelvic adhesions is that due to tuberculosis. These may follow a general abdominal peritonitis or may be produced through the blood stream from a distant focus.

Tuberculous adhesions are extremely dense and vascular, but even the most resistant forms may become completely absorbed. This is contrary to the course observed in gonorrheal types.

Mechanical injuries may result in the production of adhesions. Due to pressure necrosis from the presence of pelvic tumors, cysts, fibroids, carcinoma, etc., the peritoneal epithelium may be destroyed and adhesions form as a consequence. Operative trauma must also be included as a causative factor. In considering traumatic adhesions, it is a well known fact that these are frequently created by surgeons for the purpose of producing new ligamentous supports to prolapsed organs.

The symptoms of pelvic adhesions are produced by interference with the function and motility of the involved organs. Dysmenorrhea, backache, constipation,

feeling of weight, or pulling and dragging sensations in the lower abdomen, pain, nervousness, etc., are some of the usual manifestations.

The diagnosis of pelvic adhesions can usually be best determined by means of pelvic and rectal examinations.

In conclusion, we again desire to emphasize:

(1) The great difficulties frequently encountered in the diagnosis of abdominal adhesions and the importance of utilizing every available diagnostic measure in order that correct conclusions may be reached.

(2) The institution of prophylactic measures such as the avoidance of unnecessary trauma during operative procedures and the early stimulation of peristalsis following operation.

(3) That in the treatment of these affections surgical intervention is indicated only after all other possible means have been exhausted and then only when the symptoms are severe and disabling, or in the presence of obstructive signs.

DISCUSSION

Dr. G. C. Mizell, Atlanta, Ga.—The symptoms of adhesions may be reduced to two causes: fixation and obstruction. It depends upon the degree of the fixation or obstruction as to whether the case is a medical or surgical one. It is true that operation probably means more adhesions, but more adhesions do not always mean more symptoms. Adhesions that produce neither obstruction nor fixation will give no symptoms.

Some years ago we considered post-operative adhesions a condition that would develop within a few days after operation which would be non-progressive in extent. Recent observations have caused us to change this view. These adhesions are usually traumatic, and while they are not necessarily progressive, in some, as time goes on, there is an extension of adhesions. It may be some time after operation that we get any symptoms at all. For this reason symptoms may be mild at first. In a year or two the patient will begin to have more marked symptoms. This evidently is due to the extension of the adhesions, producing either a higher degree of fixation or obstruction. I observed recently a case where a sponge, left in at the time of the operation, was found at a second operation. This sponge had adhered to three coils of the small intestine and to the great omentum. The adhesions in the beginning did not cause any trouble, that is, for one and a half years, until the coils of the small intestine gradually became obstructed. We noticed a very interesting point in this condition. When the mass was first brought into view it was difficult to make out what it was. It was stuck on three sides to three coils of intestines. Between the attachments of the intestines to the sponge there was a margin, in some places a half inch wide. This surface appeared to be covered with an epithelium which was placed on a base of membrane perhaps a twelfth of an inch thick. That suggested some doubt in our minds that the epithelium of the peritoneum is entirely non-productive, and it occurred to us that if given a length of time there might be some extension of the epithelium and in that manner covering any raw surface.

We have made some observations recently in the treatment of adhesions involving the duodenum and the large intestine. The patients observed had marked obstructive symptoms and surgeons had refused to operate upon them because the adhesions were so extensive they could not hope for good results. Many surgeons recently have told us that they are getting away from operating for adhesions. We do not entirely agree with the surgeons in this view because, while adhesions may occur, they may do so in such a manner as to give no symptoms, and if the patient cannot be relieved by medical means we think that an operation should be done. With the patients who were refused operation we have tried pituitary extract and some have shown marked improvement.

Dr. J. L. Jelks, Memphis, Tenn.—Lane says people are born with these membranes, and Dr. Coffee says they are new. Dr. Jackson simply calls attention to the fact that he finds membranes. Thus we have Jackson's membrane and Lane's kink. They are of two kinds. First, there are prenatal membranes; and, second, there is a new form of growth. In the first place, you will always have two membranes of the pericecal prenatal type, one going over from the lateral parietal wall and the other coming forward from behind. In that membrane which is not new growth you have both circulatory and intestinal stasis. It may not be noticeable at an early age, but after a while you have secondary stasis. You have sacculation of the cecum and dilatation of the ileo-cecal sphincter so that there is a regurgitant flow of infected material back into the ileum and toxic symptoms result. In the new-found variety you have a delicate membranous formation. It is more common in the South than in the North, because there is more intestinal infection in the South than in the North, and it is in the people with intestinal infections that you find peri-intestinal veils. Many of these infections come from above, that is, from infected teeth and tonsils.

A peculiar statement was made by a surgeon to a patient upon whom he had refused to operate: "You will have a new symptom every day." She did, too, because she had adhesions everywhere. They had x-ray pictures made in several cities in this country, but the x-ray did not show adhesions. It did not tell that she had marked intestinal stasis. Yet she had adhesions everywhere and she had even one knuckle of the intestine down in the femoral canal. Why she did not have greater symptoms of obstruction I

do not know. The x-ray showed none of that. Again, the x-ray fails to tell in some cases whether the trouble is due to gastric ulcer or adhesions. Recently I operated upon a doctor's wife. The roentgenologist insisted that it must be gastric ulcer because of the permanency of the deformity. She really had adhesions from the gall-bladder over to the stomach, the result of an old cholecystitis.

Indicanuria is one of the most valuable aids in the diagnosis of intestinal obstruction.

Dr. J. C. Johnson, Atlanta, Ga.—Adhesions should be classified not as to their causation but as to their construction, and, therefore, their relation to symptoms. We know there are adhesions which occur without operation and we know there are adhesions which occur after operation. We are obliged to look upon adhesions as a symptom of some former trouble, and we must go back and see what has led up to the adhesion before we can decide whether or not it should be operated upon, treated, or let alone. With loss of tone of the abdominal walls and the gastro-intestinal canal, we have ptosis. We may have angulation of the hepatic flexure, ptosis of the transverse colon and resultant friction between that and the ascending colon. We have at once a mobility and an immobility which bring about many symptoms that we used to class as hysteria. One of the advantages of the x-ray in making a diagnosis is that it has relieved us of calling many things that we formerly did not know anything about, hysteria.

In these cases of adhesion we must decide what course will give the patient most relief. We used to have them operated upon, but I have never seen any benefit from operation for adhesions. Sometimes I think the reason is that you are interfering with something that Nature has put there, like callus between fragments of bone. If we want to do the right thing, let us prevent this ptosis. Let us relieve this friction, this irritation which leads to adhesions. We should prevent as much as cure.

Dr. A. L. Levin, New Orleans, La.—Adhesions should be classified, but I do not believe that adhesions always cause trouble. If they do, medication will not cure. It will give only transient relief. If the adhesions interfere with the proper function of the abdominal organs, then it is a surgical question. If they do not interfere the patient should be let alone. Often we observe cases with symptoms of gall-bladder colic where we think we are dealing with gall-stones and the surgeon, on opening the abdomen, finds that the gall-bladder does not empty on account of some obstruction. He finds a little membrane stretched across the cystic duct. He cuts that and the bladder empties immediately, demonstrating thereby that a small band of adhesions will often cause great disturbances and can only be relieved by the surgeon.

Dr. Irvin Abell, Louisville, Ky.—Adhesions in the abdomen may be traced to two causes: infection and trauma. I do not think adhesions, in an abdomen which has not been subjected to surgical exploration, ever occur except as the result of an infectious process. The locations as presented by the essayist are the most common sites about the gall-bladder and appendix. We do find inter-intestinal adhesions in which I believe the infection extends through the intestinal mucosa. Following operation we get the traumatic type of adhesions. The prenatal type mentioned by Dr. Johnson I do not think should be classified as adhesions.

Ordinarily when we take away the infectious process the adhesions will disappear. I do not think that this is fully understood. For instance, I have opened an abdomen and found a tremendous abscess in the appendicular region which I drained, and later having occasion to open the same abdomen for another cause, found absolutely not an adhesion anywhere. I have twice done that with pelvic abscess in which I did not feel it was wise to remove the diseased tubes, and years later on reopening the abdomen found not an adhesion. I recall one case in which I did a drainage of a pelvic abscess and the patient came four years later suffering from intestinal obstruction. I naturally presumed it was the result of the former operation, but found the obstruction high up in the abdomen with no adhesions in the pelvis.

Adhesions are not a disease, but the result of disease. They do produce disturbance of function, and when they do that, particularly if they cause obstruction, they can be corrected. So far as preventing them is concerned, I have tried petrol and olive oil, but it has not been a success. The most satisfactory method is to use omentum fat as a graft. We should not operate upon adhesions unless they produce definite disturbance of function.

MALIGNANT ADENOMATA OF THE COLON AND RECTUM*

By John L. Jelks, M.D.,
Memphis, Tenn.

When we have an adenoma in the rectum or colon we generally suppose we have to deal with a non-malignant growth. It is often the result of irritation or of amebic infection of the colon.

In this case, which I wish to report, we found numerous adenomata filling the rectum and sigmoid. We removed over 100 tumors, varying from the size of a pea to that of a pecan, which were reported by the laboratory as being non-malignant. Then the x-ray in large doses was begun. We hoped that we might get rid of others that filled the colon also in that way, since we could not remove all of them by surgical means. Incidentally, x-ray examination was made of the

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chest; and the mediastinum as well as both lungs were found filled with metastatic processes. The man died of acute lobar pneumonia. Autopsy was refused.

I report this because anyone is liable to encounter such a case. Do not suppose that it will not become malignant.

INTRA-ABDOMINAL GUMMA*

By A. L. Levin, M.D.,
New Orleans, La.

My object in reporting this case to you is to call your attention to the fact that loss in weight, age, pain and a palpable abdominal mass does not always speak for malignancy; the oldest foe of the human race, syphilis, is quite often the responsible agent, as exemplified in the following case:

A gentleman, aged 74, eighteen months previous to my examination, began to lose in weight and complain of symptoms of indigestion. His main complaint was epigastric and abdominal pain, mostly at night, and was so severe that he could not sleep. He would have to get up and walk the floor at night, and he had lost about thirty pounds during the period of his illness.

He was handled by competent men, and I understood from the history that an x-ray was taken and a diagnosis of malignancy was made, evidently gastric carcinoma. He was put on morphin, a quarter of a grain three times a day, and if necessary more, and told that there was nothing to do, and that there was no use to come to New Orleans for further examination.

I was attending his two sons who came to my clinic, and they advised him to consult me. When he came to the office he did not appear to me to be a case of malignancy. An individual suffering from malignancy for eighteen months has a typical cachexia which he did not possess. He had good color in his face and looked robust. His main complaint was the pain, which was worse at night. On examination I found a mass in the abdomen, and I was not certain whether it was a gastric mass or connected with the liver. The analysis on two occasions showed a total achylia. On examining him a little more closely I noticed that he had a small lesion on the right forearm with induration. I asked him how long he had had that and he said about two months. He had used powder on it but it did not heal. The lesion impressed me as an interesting diagnostic point, taken in conjunction with the mass, the pain, the loss of weight for eighteen months, without a typical malignant tachexia. I looked upon it as a syphilitic gumma. Dr. Lanford, the pathologist at the Touro Infirmary, confirmed my diagnosis.

We made an x-ray to see whether the abdominal mass had any relationship to the stomach. Fluoroscopically and also radiographically we found the stomach to be normal in outline, with no deformity, and that it emptied well. The simple fact that the pain is worse at night should always make us suspect that we have lues as a cause. A Wassermann was made and we obtained a strongly positive reaction. I started him on arsphenamin, mercury rubs, etc.; and as soon as the treatment was started I ordered morphia to be discontinued. He began to gain in weight, has no pain, and is gaining very rapidly despite his advanced age. I saw him last week and he told me he had not felt so well for years. The mass is diminishing to a considerable extent.

September, 1922.—Since the report of this case, I have observed the patient from time to time, and it is interesting to note the almost complete disappearance of the mass under intensive antiluetic treatment, and freedom from any gastro-intestinal disturbance.

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TROPICAL DISEASES AND PUBLIC HEALTH

METHODS OF GETTING PEOPLE TO BUILD PRIVIES*

By A. T. McCormack, M.D.,
State Health Officer,
Louisville, Ky.

"And Moses called to Israel and said unto them, 'Hear, O Israel, the statutes and judgments which I speak in your ears this day that ye may learn them and quote them and have them.'"

And later, among the important ordnances laid down for the conduct of the forming nation, he uttered the following fundamental law:

"Thou shalt have a place also without the camp (or city or home), whither thou shalt go forth abroad; thou shalt have a paddle upon thy weapon; and it shall be, when thou wilt ease thyself (sitteth down) abroad, thou shalt dig therewith, and shall turn back and cover that which cometh from thee. For the Lord, thy God walketh in the midst of thy camp (or city or home), to deliver thee and to give up thine enemies before thee; therefore, shall thy camp (or city or home) be holy; that He see no unclean thing in thee and turn away from thee."

Thundered from Sinai, the inspired injunctions placed upon the traveling warrior families of Israel, may well be recalled to the Christian people of this era, and no more potential reason can be urged than that God, Himself, through his inspired prophet, made this a permanent law to his chosen people, and that the Christian people now, as their heirs, are living and should obey this same injunction. As essential as it was and is that travelers should cover up the discharges from their bodies, it is quite apparent that it is often more essential to the prolongation of healthy human lives that in towns and cities, in homes and habitations, that practicable methods be found and utilized for the control of soil pollution, which is one of the two greatest human causes of disease. It is essential that the people recognize the basic fact that the discharges from the orifices of the human body are the greatest causative factor of acute diseases outside the tropics. In proportion as unclean discharges from the mouth, the bowels and the genito-urinary system shall be controlled, just so rapidly will the transmission of the acute diseases from person to person, home to home, and community to community be controlled.

In proportion as the health organization of a community sells this proposition to the public which supports it, will privy building and the resulting purification of water be carried out effectively.

In making the matter practicable, two plans suggest themselves. One is an intensive survey and privy building by a staff devoting time to this particular activity. Two is the carrying on the work of sanitation as one of the activities of a county health department with a varied health program.

The first plan, effectively and enthusiastically carried out by a trained staff, results in the rapid installation of improved types of privies—particularly the cheaper types—and is to be recommended only where the funds are largely provided by the State or outside sources, and where there is no reasonable probability of the formation and maintenance of a county health department. Starting, as we all must, with a part-time health officer as a nucleus of a county health department, we might say the caterpillar stage of public health work, it is our conception that the reasonable plan is to secure as the first all-time worker in each county health unit, a specially prepared public health nurse who shall have been furnished with the accurate knowledge of how to reach her people in their homes with the particular thing they most need that will give them confidence in the public health movement. She should understand all the time that, under the supervision of the part-time health officer, and with the cooperation of other forward-looking agencies interested in the welfare of her county, she is developing the sentiment which will finally eventuate in the formation of a complete all-time health department.

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During this stage, where practical, she should convince the school authorities of the necessity for such sanitary disposal of bowel discharges from the children while in school that they will develop what Lumsden has well called the "privy conscience," so that they will know that it is a potential crime to distribute body discharges where they may infect water supplies or may be carried by human or domestic animals or flies to the food supplies, or into the homes, and there cause disease. Privies installed in schools should be of a permanent type. Their installation, maintenance, and supervision should be the definite responsibility of some one individual who should be made to realize that it is as important to teach their proper use and care as it is to teach the children English, history, mathematics or any other branch of learning.

In a few months or years, depending upon the educational standards and grade of health intelligence of each particular community, there will be developed a county health department with an especially trained all-time health officer, having under him such a personnel of these trained public health nurses, with an especially apt one of their number as supervisor, and a trained sanitary inspector, who can actually build or supervise the building of the necessary sanitary structures, and, as the nurses are teaching the people the necessity for their use, can teach them the method of their maintenance and use.

I am personally doubtful of the advisability of the rapid building of a large number of cheap type privies or other sanitary structures by a crew which will not be kept permanently at work to maintain them in a useful and safe condition.

As soon as a popular demand has been created for the permanent type of privy, commercial firms should be interested in their building, and with modern salesmanship methods, they can rapidly sell the sanitary privy to the people of the county.

Their installation should always be made under the supervision of the county health department, and it should be provided in the contracts that they will not be accepted until, upon completion, they have received the written approval of the county health officer. At frequent intervals, following their installation, the sanitary inspector should visit them, and should bring to the attention of the responsible householder mistakes in their management which are causing dissatisfaction with them.

President Coates, of the Eastern Kentucky Normal School, in 1911 suggested to the writer the following essentials of a sanitary privy:

(1) That it should be self-cleansing.

(2) That it may be kept practically odorless so that it may be close enough to the house to be used.

(3) That it should be water-tight and insect proof.

(4) That it should be cheap enough and simple enough in construction and operation to be used and maintained successfully in every home.

It was from this formula that my father, Dr. J. N. McCormack, devised and has from time to time improved the Kentucky sanitary privy, which is the only legal privy in Kentucky, and which is being satisfactorily installed in schools, public buildings, railroad stations, industrial communities, the unsewered outskirts of cities and towns, and in the best and humblest homes in the country districts. Its installation in Kentucky has been a very slow but steady growth, and its successful operation has depended upon the intelligence of the individual home installing it where there was no health department and upon the efficiency of the sanitary inspector in the counties or communities having health organizations.

At the beginning of a privy campaign, more or less extensive surveys are of distinct use. A county or town map, showing the location and type of privy in use at the beginning of the survey at each individual home, posted in a public place so that as each is improved the type of improvement may be graphically shown, is of distinct value. Such maps or charts should be displayed in the court houses and in postoffices in the various communities undertaking the work. The force of public opinion, as the red marks at the various homes increase, will silently and effectively convince the obstinate, the doubtful, and the ignorant.

The public health nurse going into the home where disease is, or where physical defects have been found in school children, should casually tell about the spread of typhoid fever in that or some near-by community from fly infection or water pollution, from no care of bowel discharges, is helping bit by bit to secure the co-operation of the women of the family in urging upon their men folk the necessity for installing a sanitary privy.

The children in a school where they are taught the proper use and proper respect for a sanitary privy are the most effective educators back in the home. The school which permits its toilets to be desecrated, to remain in a filthy condition, is really worse than no school at all, whatever else it may teach its children, and this fact should be impressed upon educators at every possible opportunity. All of those working with a health department, and all the agencies co-operating with a department, such as the farm demonstrators and the home economics representatives of the agricultural departments, should be especially brought into line in these regards, because their recommendations will carry great weight with many members of the community which it would otherwise be difficult to reach. Carefully prepared newspaper articles indicating the comparative building in privy sense in this particular county with others and put in bold type so that it may be read and digested at leisure, the necessity for such means of health protection, prepares the individual mind for contact with the privy builder.

The sanitary inspector is one of the most essential of all the modern health workers. Developed from necessity, he has too frequently been permitted, like Topsy, just to grow, and has been used rather as an errand boy of the health department than as a trained worker. The School of Public Health of the University of Louisville has recognized the imperative demand for sanitary inspectors being properly trained so that they can better do their work without lost motion, and with greatest effectiveness, and it expects to be able to supply such trained workers in increasing numbers from year to year. The trained sanitary inspector should be able to talk to a family intelligently and convincingly about the character of their sanitary structures. He should be able to point out methods for their improvement or for the installation of new ones. He should be able to examine the water supply in such constructive way as will convince its users of the necessity for the prevention of surface pollution as well as sub-surface pollution. He should be able to show them the effect of polluted water, understanding that if he only proves that the water supply is bad without at the same time showing how they can secure a good one, he has been a failure. After the Kentucky Sanitary Privy has been installed, he should convince them of the necessity of, and economy in, the use of toilet paper, and by visits varying in frequency with the intelligence of the householder, he should as rapidly as possible train them how to maintain and care for it. No other permanent official in a county is of more importance to the health and welfare of the county than a trained sanitary inspector.

We realize that there will always be found in every community a few survivors so mean that they do not care what happens to their families or their neighbors, so stingy that they would not spend a penny for eternal salvation, and so obstinate that they will never have a particle of community spirit. For such as these, the whole community must be trained that one insanitary family is a danger to all the rest, and upon this recalcitrant nuisance notice must be served, but it must only be served after the privy sense of the community has been sufficiently dwelt upon, and jurors must be found who will subject them to penalties of the law rather than to the much larger penalties that negligence and ignorance have always been mulcting them with.

In the beginning of a privy campaign, it is frequently wise, where sufficient funds are available, to supply not only the sanitary inspector as the supervisor of the improved type of privy, but to provide a definite proportion of labor to the householder who will secure the necessary material for privy construction.

After the privy demand has been sufficiently increased, supervision only should be furnished without cost. In some communities it will be found better to organ-

ize privy-building crews under the supervision of the health officer, with whom the individual householder can contract for his necessary building. Privy building, however, will become universal in a community only where commercial firms have been formed which will sell privies just as they sell binders, silos and other necessities.

Health officials should clearly understand that the mere building of any type of privy has not sanitated the home until the water supply has been protected from surface contamination also, and while the material is being secured for building a sanitary privy, enough sand, rock and cement should be bought to build the right type of well or cistern top, which should be built sufficiently deep below the surface actually to protect it from surface pollution and prevent contamination from animals or human beings walking around it. The people should be taught the necessity for the chlorination of cistern and well supplies where they are polluted; and the privy-building and water-improvement campaign should be carried on simultaneously, each indicating the necessity for the other.

It is of especial importance that medical students and physicians be reached on every possible occasion with the necessity for privy building. The most influential health officer who will ever get into most homes with real authority is their family physician, and no other agent is so potent in influence for all the necessity for improving sanitation as is the right thinking, right acting physician; and professional public opinion should be formed and maintained so that it will consider the doctor whose home or whose house, farms or plantation are not properly sanitated so that he and his family, as well as his neighbors, his tenants and his renters are protected from the dangers of soil pollution and polluted water supply, is not the right sort of doctor for the people to employ.

The American people are essentially a Christian people. While too frequently they exercise their gifts and graces in foreign lands or in church buildings where they do not live, it is important to call them to the sense of duty laid down by the great law giver in his sanitary injunctions, and it is the duty of health officials, physicians, public health nurses and sanitary inspectors to make every man, woman and child in this whole country realize that they cannot treat their neighbors as they themselves would be treated until they learn how, and until they actually dispose of the discharges from their bodies in such a way that they cannot carry disease to others.

DISCUSSION

Dr. C. W. Garrison, State Health Officer, Little Rock, Ark.—This is a subject which we have been discussing most intensively for ten or twelve years, and it seems to me we have made little progress. We are all agreed that every community, and in many cases every home, has its individual problems, and that one of the principal things to consider in recommending a privy for general use in any community is first to make a survey in that community and ascertain something of the geological formation. In Mississippi and some other states it is no doubt entirely feasible, practicable and safe to recommend the pit privy. In other sections, as in Arkansas, it would be entirely out of keeping with fundamental facts because of the geological formation and the lines of cleavage which no one can anticipate. In such cases we must resort to some water-tight type of privy. The question of disposal where water types are installed is a serious one. In some sections we can satisfactorily dispose of it by sub-drainage or sub-irrigation, but in others we find that at certain seasons, when there is super-saturation, it will not take up the effluent. In other sections the soil is of such character as not to permit absorption. In others we find the effluent turned into the streets and ditches, where it becomes a greater nuisance from the standpoint of public opinion than the old open-back toilet. These are some of the problems that we meet in every state.

Dr. W. E. Deeks, Medical Director, United Fruit Company, New York, N. Y.—We have been building many privies in our plantation work, principally along two types. We have developed some new features which may be of service in some of the rural districts in this country.

In sinking a pit, if you have good hard clay soil that will stay up, you do not need to bank it. Lumber is very inefficient. We have developed a system of making concrete slabs about two inches thick and about the size or width of two hands, with male and female ends so they fit into each other and lock. It is not necessary to make them water tight. The water can soak out at the bottom. We fit them into each other and thus make a permanent pit.

The Chair.—You have four sides of cement?

Dr. Deeks.—Four cement slabs with male and female ends that will interlock.

In putting a house on top of this pit it is very important to have the seat placed well forward; otherwise you are contaminating the back of your pit all the time and making it accessible to flies. You want at least ten or twelve inches of the opening in the seat to the back.

Another thing is, these should be ventilated. Any kind of waste pipe running from the bottom up is all that is necessary. We make an automatic cover to fit this. A person using this toilet sits down and the cover rests at his back. As soon as he gets up the cover automatically drops and prevents flies from entering. It has been found very efficient.

There is another class of privy built particularly for the coolie which might work very well in some places. We build a house just wide enough for a man to stand in, two feet in width. There is no seat, but merely an opening in the floor which runs from front to back. A person going in there must squat in a certain position, and there is no danger of soiljng the floor. There is a long cover which fits over the top when not in use, and which rests on the back of the occupant when in use. He cannot get from one side to the other because the building is narrow, and there is no inducement for him to stay in there. It has worked very well.

A Member.—May I ask how you keep children from falling through that?

Dr. Deeks.—Wherever there are children in the place we build the floor higher, leaving a foot in front on a level about six or eight inches lower than the rest of the floor and the child will sit on the front of the elevated part. The opening is never more than seven inches wide, so there is no danger of the child's falling through, and there is no danger of contamination of the seat. We are building a great many of this type.

Dr. Garrison.—I disagree with Dr. McCormack with reference to the chlorination of wells. It is bad policy to recommend that to the public. I personally believe it is impossible to chlorinate a well and make it safe. You can improve the water and make it safe for the time being, but if you have contaminated soil or surface drainage it cannot be reached by chlorination. As a substitute we offer a contrivance with a little formula for chlorinating the water after drawing it from the well.

Mr. C. H. Kibbey, T. C., I. and R. R. Co., Birmingham, Ala.—Many of our rural districts do not show any better method of disposal today than obtained under the law of Moses.

I agree with Dr. Deeks that some method of privy building must be adopted that is fool-proof, and the idea of having the seat cover so arranged that it falls of its own weight is an ideal one. In our experience we have found this objection: the intelligence and interest of the individual user is necessary for making any type of privy sanitary. We find that our tenants take the seat covers, on account of the fact that their weight rests on the back while using the privy, and in many instances nail them up, tie them up, or even tear them off entirely. When it comes to sanitary dry closets, I have about made up my mind that there is no such thing. If there is, it depends upon our education of the public to use them intelligently.

Dr. P. E. Blackerby, Louisville, Ky.—We not only have to get people to build a sanitary type of privy, but we must teach them how to maintain them after they are built. That has been the chief trouble everywhere. We must have training of the people and as far as possible intelligent supervision over the system after it has been established.

As Dr. McCormack stated in his paper, we adhere strictly to the septic tank type of privy in Kentucky, because there is practically no soil in Kentucky that we can adapt the pit type to.

In Alabama I saw some pit types of privies which were absolutely satisfactory and bound to continue that way unless mistreated by the individuals themselves. In Kentucky we have found practically no section to which we could adapt the pit type. We have in central and eastern Kentucky limestone soil, and in the western part the high water level, where we cannot use them.

If soil pollution contributes in any way to the spread of pellagra we have another argument to use in connection with our training of the public mind for the need of sanitary privies. There must be something significant in the reduction of mortality from pellagra and the intense privy building work in the South following the hookworm survey work.

The International Health Board has recently published a monograph by Dr. Kligler on the septic tank type of privy and the pit privy, showing the effects of surface and sub-surface pollution, and just how far from these types of privies they find pollution. It is one of the most interesting studies yet made and we are reserving judgment in Kentucky on what was said as to these types until our sanitary engineer can make an intensive study of this monograph and see what conclusions Dr. Kligler has come to in regard to the Kentucky type of privy.

SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

BONE ATROPHY*

By Barney Brooks, M.D.,
St. Louis, Mo.

It is generally known that if an extremity is not used its muscles become smaller and less powerful. The fact that a change of a correspondingly great magnitude takes place in the bones of the non-used extremity is not generally appreciated. In fact, the changes in bone which follow lack of normal function have often been interpreted as changes due to disease. Thus one observer describes the bone atrophy of acute osteomyelitis, another of tuberculosis, and others of nerve paralysis. These changes which have been found are the same in all instances and we believe they are not the direct result of the specific disease in question, but are the result of lack of function of the diseased extremities.

The changes in bone due to lack of function only are of such a nature that they are often interpreted as due to some specific disease process in the bone, and thus lead to errors in diagnosis. For example, the x-ray photograph of a bone which shows nothing other than the changes which result from lack of function is not uncommonly interpreted as tuberculosis, osteomyelitis, or bone tumor. It is particularly often that such a plate is interpreted as metastatic bone cancer.

For the study of the process of bone atrophy material has been obtained from patients suffering from poliomyelitis, traumatic nerve injuries, tuberculosis of bone, fracture, acute pyogenic osteomyelitis, deformities, congenital and acquired, and other conditions in which one extremity has not been used. Also the bones of animals in which function of one extremity has been impaired by nerve section, joint injury or simple fixation by a plaster cast have been studied. In all instances the bones of the non-used extremity were compared with the bones of the used extremity. The bones were studied in gross, by x-ray, microscopically, chemically, and physically.

In all instances the changes were the same regardless of the cause of the non-use, thus showing that there is no necessity for assuming that any factor other than lack of function was responsible. In other words, the bone atrophy which follows a nerve injury is not the result of "trophic" influences and that following an acute osteomyelitis is not the direct result of the toxins of the organisms, but in each instance is the result of the lack of function of the extremity just as it follows the simple fixation of a normal extremity in a plaster cast.

Bone changes make their appearance in a very few days after the cessation of function of the extremity. In the experimental animal well marked changes are found after ten days of non-use. The changes progress rapidly and are very marked in ten to twelve weeks. Apparently a maximum is reached in six to twelve months beyond which point there is very little change.

In the adult, non-use of an extremity causes the bones to become lighter and more fragile. The length of the bone is unchanged. The diameter is only slightly decreased. The diameter of the medullary canal is markedly increased. This makes the cortex of the shaft much thinner. The trabeculae of the cancellous bone of the epiphyses become much thinner and in many areas disappear completely.

After long periods of non-use the compact bone of the shaft becomes cancellous. The chemical composition of the entire bone is changed markedly. There is a loss of mineral constituent and an increase in the proportions of organic material. The strength of the whole bone is much decreased. After a period of ten to twelve weeks of lack of function it may support

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only half as much weight as the corresponding used bone.

This analysis of the effect of the lack of function upon a bone as a whole is particularly interesting when it is compared with the effect of non-use upon bone as a tissue. Thus, if pieces of bone of the same size and shape are taken from the bones of the used and non-used extremities and examined chemically and physically, it is found that they are identical.

It, therefore, follows that lack of functon affects the size, shape, weight, x-ray appearance and strength of bones by a change in the amount of the matrix present and the characteristics of bone tissue are not changed. The change is quantitative and not qualitative.

If the onset of the cessation of function is during the growing period the process of non-use bone atrophy is associated with the process of bone growth which is only inhibited by lack of function, and the end-result is entirely different from that following lack of function beginning after growth has been established. The end-result of constant lack of function during the growing period on a bone of an extremity is to produce a bone which is relatively shorter and smaller. The relative size of the epiphyses and shaft of the bone is changed in that the shaft is relatively smaller than the epiphyses. The densities of the compact bone of the shaft and of the cancellous bone of the epiphyses are about normal. The chemical composition and physical characteristics of the bone tissue are the same as normal used bone.

One other property of bone is very important. This property is regeneration, that is, the power of the bone tissue to repair a defect in itself. This is a property of the bone cells and not of the bone matrix. From a clinical study of the repair process in atrophied bones and the careful study of transplants of bone in animals in which transplants of atrophied bone have been compared with transplants of non-atrophied bone it was not possible to detect any difference in the regeneration power of these two types of bone transplants. When it is considered how frequently one sees in the literature the statement that function is essential to the success of a bone transplant this seems like rank heresy. But when it is considered in the light of the steps that Nature herself takes in the repair of bone it does not seem unreasonable. Thus, for example, lack of function follows a fracture and it would seem most unlikely that Nature would have arranged that this lack of function would inhibit the process which is ultimately to cure it.

In conclusion, I wish to emphasize that lack of function alone causes marked change in the x-ray appearance of bones, and this fact must be taken into consideration in the diagnosis of any bone disease. Furthermore, the presence of bone atrophy manifest in an x-ray photograph is often of great importance in diagnosis of bone disease as it indicates continued lack of proper function even when the history is not clear.

So far we have dealt only with the cause and character of these changes in bone which result from lack of function. I cannot conclude without at least a word as regards their prevention.

Bone atrophy is a condition from which recovery is very slow, if indeed it is ever complete. Therefore, it is very important that it should be prevented. The only way it can be prevented is by the preservation through the period of treatment of the disease of as much functional use as is consistent with the proper healing of the disease.

No better example could be cited than that of a fracture. The patient sustains a fracture. A reduction is done and the fractured extremity put in a plaster cast, where it is left for five, eight or ten weeks. The plaster is removed and x-ray shows the fracture united in perfect position. Yet the extremity is useless. The muscles and bones are atrophic, the joint capsules and tendons fixed and inelastic, and months are consumed in the effort to get the extremity back into a useful state. In other words, the patient is in a disabled state not so much from the fracture as from the treatment of the fracture.

Absolute fixation of an extremity is only very rarely necessary. Active motion and massage are usually possible throughout the course of treatment of the disease.

The reason for this failure to prevent non-use atrophy is that most bone lesions are treated in two stages and I am sorry to say that very often one man treats one

stage and another treats the other stage. The first stage is aimed at getting the bone lesion healed and the next stage is the attempt to re-establish function. In the great majority of instances if the second stage had been kept in mind during the first stage there would have been no second stage. If the general surgeon or general practitioner kept in mind during the early stages of disabling diseases of the extremity the ultimate functional result there would be little use for what is now known as orthopedic surgery.

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DISCUSSION

Dr. J. Edgar Stewart, St. Louis, Mo.—I have been in touch with Dr. Brooks' experimental work on bone atrophy and have had some very interesting discussions with him in regard to how to apply it to the practice of orthopedic surgery, not only from the standpoint of modifying the treatment that necessarily requires a certain amount of fixation or immobilization, but from the standpoint of some puzzling cases that we sometimes see. I reviewed the cases of tuberculosis of the hip in children seen at the St. Louis Children's Hospital during five years, and was much surprised at the great number where the history seemed to indicate an acute onset. These are seen particularly in the dispensary practice where the children do not receive much attention at home. Probably when they go to bed at night they are seen for the only time, and in many instances the mother will complain that Johnny was perfectly well until he fell down during play, or screamed out during the night and was not able to walk the next day. Of course, a certain number of these cases are due to injury of the hip, possibly due to contusion of the bone, and some of them are certainly due to tuberculosis of the hip where the limp and the disability have not been noticed. I have noticed that in these cases which afterward run the regular course of tuberculosis of the hip, x-rays taken at the time of the first examination show bone atrophy in the affected side, proving that there must have been limitation of motion in this side for some time, and indicating that the condition did not start on the previous day. This gives us a little better grasp for starting treatment.

Perhaps the most striking place where this is demonstrated clinically is in cases of fixation of the hip joint in ankylosis, where a picture of the entire pelvis is taken showing the upper ends of both femurs. The side affected shows a very marked bone atrophy. I, personally, used to consider that there was a disease of the upper end of the femur which caused this marked difference from the other side. Dr. Brooks has convinced me that this is purely bone atrophy and not the disease which causes ankylosis of the hip. The same thing is seen in shoulder cases, so-called subdeltoid bursitis. This is not so noticeable because usually pictures of both shoulders on the same plate are not taken, but it is marked enough to cause confusion.

Dr. Brooks (closing).—The x-ray specialists speak of decalcification of bones. If a bone is not used the x-ray plate shows that the bone is thin and it is said to be decalcified, implying that the thinness is due to a disappearance of the calcium salts. That is not the whole truth. It is a disappearance of the bone, of the entire thickness of the bone. That which is left has just the same analysis as the normal bone. The thinning is not a decalcification but a deossification.

FRACTURES OF THE SKULL*

By Ernest Sachs, M.D.,
Professor of Clinical Neurological Surgery, Washington University Medical School,
St. Louis, Mo.

In articles on fractures of the skull it has been the time honored custom to devote much time to the mechanism by which a fracture occurs. Though this is of great academic interest, so far as I have been able to discover it is of little value in enabling one to decide how best to deal with a given fracture case. Some men have distinguished between fractures of the vault and fractures of the base, claiming that basal fractures have such a bad prognosis that little can be done for them.

Fractures might with advantage be approached from a somewhat different angle. Instead of basing one's decision upon the nature or location of the fracture, the decision as to how to proceed in a given case should depend upon the intracranial symptoms. The two exceptions I make are, first, in the case of depressed fractures of the skull. These should be operated upon and elevated even if there are no symptoms whatever, on account of the danger of symptoms developing at a later date. The second group of cases is composed of compound fractures of the skull with and without laceration of the dura. These also should be operated upon at once and like contaminated wounds elsewhere in the body be treated by debridement and primary suture. When the dura is torn and the brain is lacerated, the devitalized

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cortex must be removed. This can be done by suction, as was practiced in war wounds of the brain, but frequently when it is not possible to remove the devitalized tissue in this way a clean excision with a knife is made. If much of the dura has been destroyed a fascial transplant has been inserted in some cases.

The treatment of all other cases of fractures of the skull should be based upon a study of the neurological symptoms. These are due to general compression, or to irritation or destruction of some portion of the brain.

In observing these cases the most difficult point to decide is what symptoms warrant operative interference and how they may be best dealt with. Though I have fluctuated somewhat from year to year in my operative indications and at times am more conservative, in general I think I operate upon more cases of fractures today than I did five years ago.

When a case of suspected fracture is brought into the hospital, the blood pressure is immediately taken and the eye grounds are examined. From this time on, the blood pressure is taken every fifteen minutes. The observation at frequent intervals of the blood pressure gives us the best evidence of a progressing hemorrhage; for, as was pointed out by Cushing many years ago, with rapidly increasing intracranial pressure, the blood pressure rises steadily. If the blood pressure readings are to be of value they must be taken frequently, for when this change does occur it is a matter of minutes, not hours. This fact has not been emphasized sufficiently and men have thought that an occasional blood pressure reading would be enough. To make this frequent recording of blood pressure possible, the nurses have been trained to take it. If there is a progressive rise in pressure we take it as positive evidence that a hemorrhage is going on and operate upon all such cases as promptly as possible. Such hemorrhages frequently come from the middle meningeal artery and a careful neurological examination is made to try to determine on which side the hemorrhage is going on. In coming to this decision I disregard the site of the fracture entirely, as the lesion may have been a *contre coup* one. Frequently a very slight pathological sign suffices to enable one to determine upon which side to operate. A pathological toe sign, Babinski or Oppenheim carries more weight with me than an x-ray plate showing an obvious fracture. I know of no more difficult decision to make than to open one side of a patient's head when the other side shows all the evidences of a severe fracture. The neurological symptoms may indicate that the lesion is on the side of the fracture, but it is these symptoms which should be the guide and not the fracture itself. Among cases of fractured skull, hemorrhage cases are comparatively rare and every one is, I believe, in accord that early operation is the proper procedure.

Difficulties arise and opinions differ when we are confronted with a case of which this is a fairly typical history. A patient has been in an accident and is brought into the hospital unconscious. His systolic blood pressure is around 160, pulse is slow, eye grounds show some congestion and tortuosity of the vessels, and an x-ray plate shows a fracture at the base. Neurological examination may show one or both pupils dilated. The reflexes may be pathological and may be exaggerated only on one side. What is the condition of the intracranial contents and how should we deal with such a case?

Such a patient to my mind has a contusion and laceration of his brain, and an important factor in his unconsciousness is the rapidly progressing edema which accompanies such a trauma. The cause of the unconsciousness in these cases is, however, by no means settled. One of the explanations that is frequently given is that this is due to concussion. It is almost sacrilege to question the wisdom of using this term, but I know of no more abused term in all of medicine. What is concussion and what are the clinical signs? After looking up the question repeatedly and observing many cases I have concluded that there is no way of distinguishing a case of concussion from a mild case of contusion and laceration. There is no group of symptoms that is pathognomonic of concussion. Patients with proven contusions and lacerations have the same symptoms that cases of so-called concussion have had. Since no symptomatology is characteristic of concussion, obviously it is impossible to

say what the pathology of the condition is. The cases that are very mild do not die and the pathology is, therefore, obscure. Those cases that have punctate hemorrhages I consider just as much contusions and lacerations as those cases that have a great gross destruction of the brain. I, therefore, practically never use the term concussion, and class all my cases under the heading of contusion and laceration. The only picture that can properly be called concussion is the momentary unconsciousness followed by an hour or two of slow pulse, which we see frequently when an individual receives a comparatively light blow on the head.

To come back now to the case of fractured skull just described, in view of my belief that the condition is due to edema of the brain, such a case should be decompressed to make room for the inevitable compression that is produced. But there are several factors that have to be considered before this decision is reached: first of all there is the height of the blood pressure. This must be normal or above normal. If it is low or falling it is an evidence that the patient's medullary centres are exhausted and death is about to occur. Any surgical treatment during this last stage of compression is useless. Another but much more difficult point to decide arises in those cases which are seen in the condition described, but within a few minutes or half hour show signs of returning consciousness. They are no longer deeply unconscious, but may be semiconscious, that is, they move about if given a fairly violent sensory stimulus. In these cases I generally wait and if they become progressively clearer mentally, of course I do not operate.

Cases of this type are quite numerous. If the case continues in a semiconscious condition, often very restless, I decompress them sometimes after twelve hours and in some cases after several days. Some surgeons have advocated waiting, on the ground that the results are better twenty-four hours later than early in the condition. I believe if operation is at all indicated the earlier one operates the better for the patient. When I wait it is always in the hope that no operation will be necessary. We all know how misleading statistics are. The men who report better results from late operation than early operation perhaps lose sight of the fact that without operation a certain number of cases die in the first twenty-four hours even if not operated upon. These are excluded from their figures. The longer a patient survives after a fractured skull the better the ultimate prognosis, and consequently if operation is delayed there naturally will be fewer fatalities. The operation in these semiconscious cases relieves pressure, and I have the very positive impression that they return to normal much more quickly than if left alone. If left alone, frequently for weeks they are dull and apathetic and complain of headache. It is in this type of case that we operate more frequently than formerly.

The next question to consider is what operative procedure is to be carried out and what measures safeguard operation in these cases. I rarely turn down an osteoplastic flap in a fracture case, as has been advocated, but content myself with a subtemporal decompression. The purpose in operating upon these cases is to relieve pressure. This can be accomplished by a large decompression opening and in exceptional cases by means of a bilateral decompression at least as well as when a flap is turned down. When the dura is exposed in one of these traumatic cases it is as a rule tense, and often bluish or plum colored, due to blood under the dura. If such a dura is opened the brain forces its way out, the cortex ruptures, and thus serious permanent damage is almost certain to occur. For that reason the intradural pressure must always first be reduced. This is most effectually done by means of a ventrical puncture either through the decompression wound by striking the inferior cornu of the ventricle or through the frontal lobe, where the ventricle is readily reached if it is missed in the temporal lobe. This reduction of intradural pressure to normal or below normal is the most important step in the operative procedure, but pressure should never be reduced by lumbar puncture, as that is dangerous. If this precaution is taken the operation is practically unattended by any danger.

The question that one naturally asks is, to what extent does this operation reduce the mortality? That cannot be answered with statistical figures, but I feel convinced that we have saved patients who

otherwise would have died. Of course the mortality will always be higher among the operated cases, since the unoperated cases include the large number of mild cases that always recover in a few days. If the intradural pressure is reduced the operative procedure becomes a safe one and is not responsible for death. When they die, as some of them inevitably do, death is due to the cerebral injury.

In summing up, I would say that the decision as to what to do for a case of fractured skull must be based upon the evidence of injury to the intracranial contents and not upon the injury to the skull. The most important factor is to protect the brain from compression produced by the edema which always accompanies contusion and laceration of the brain.

DISCUSSION

Dr. LeRoy Long, Oklahoma City, Okla.—With the exceptions mentioned, that is, depressed fractures and compound fractures, there is one single course that should be followed in fracture of the skull. That is determined by an intelligent conception of the pathology, it being remembered that the important pathology is not found in the skull, but in the vital structures on the inside of the skull.

There is a very faulty impression as to what brain injury means in the minds of many practitioners. When examining applicants for commissions in the Medical Corps of the Army, I once asked an applicant: "What is meant by general compression of the brain?" He replied that it was a condition in which a foreign body, like a piece of bone, was pressing down upon the brain. I asked the next man: "What is meant by 'compression of the brain?'" He, like the first, replied that it was pressure on the brain by "bone or something." I asked all of them for several days, and not once was told that compression of the brain means an increase of intracranial tension to the point at which the vital functions are interfered with.

In all these patients we must look for evidences of disturbance of brain function. The question of preeminent importance is not what has happened to the skull, but what has happened to the brain. The existence or non-existence of a fracture will not determine the treatment, which must be determined by far more important considerations. No patient should be operated upon in shock, regardless of the character of the injury. When the blood pressure is below normal, with weak pulse, shallow respiration and other evidences of loss of resistance, no one who has the proper conception of the condition confronting him would think of operating. The operative or the non-operative treatment of trauma of the brain should not be discussed upon its relative merits except when applied to the condition of the individual patient. If the blood pressure goes above normal, and continues to rise with a slow pulse that progressively becomes slower, operation should be done promptly, because if it is put off we run the risk of a terminal edema that will be disastrous. If the blood pressure gradually returns to normal, without a slow pulse, rhythmic breathing, papillary edema or other evidence of increased intracranial tension, the patient should not be touched, fracture or no fracture.

When these patients come to the hospital in shock they should be handled very little. It is a standing order in my clinic that they shall not be taken to the x-ray department. I do this for two reasons: first, the handling and manipulation incident to the procedure may destroy the patient's slight margin of safety; and second, I wish to impress upon the house staff the fact that we are dealing with an injury of the brain, and that we are not particularly interested in fracture of the skull except as it is associated with injury of the brain.

I agree with the method of the author in reducing intracranial tension when it is necessary to do it. Spinal puncture is not a safe procedure in these cases and should not be done except under unusual circumstances. For instance, during the influenza epidemic in 1918, a boy was brought in with a brain injury. He had a rising blood pressure, slow pulse and other evidences of "compression" or increased intracranial tension. Under ordinary circumstances, he should have been operated upon, but we had had two post-operative deaths due to influenza, and had discontinued operative work except in strict emergencies. I decided to risk a spinal puncture, but I believe that we should be in that sort of a situation before we resort to so serious a procedure.

I should like to know what Dr. Sachs thinks about the cases that are compounded into the nasal fossa and the ear with especial reference to the advisability or non-advisability of attempting to clean out these cavities. I have felt that they should be handled without doing much to the cavities into which they are compounded. You will find in the books that one should spray, wash and irrigate. In the ear, if anything at all is done, the canal should be wiped out with the greatest gentleness, and then a little sterile cotton should be very lightly inserted. The nose should never be sprayed, washed or irrigated in connection with a fracture extending into the nasal fossa: first, because of the danger of spreading infection, and second, because it is impossible to use a spray or douche which has much cleansing effect.

Dr. Sachs (closing).—I agree with what Dr. Long said about moving the patients to the x-ray room. I did not wish to convey the idea that the patients were taken directly to the x-ray room. There is nothing more dangerous than to move them around.

I was pleased with the emphasis the Doctor laid upon the danger of spinal puncture. I think I go a little further than he does. I do not touch the nose or ear at all. We put a little cotton in the ear if the fracture goes through it. We cannot clean an ear out anyway, and the danger of producing infection is greater than the chance of preventing it.

THE TREATMENT OF PUERPERAL FEVER*

By John T. Altman, M.D.,
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In the United States alone, it is claimed that fully eight thousand women die of puerperal infection every year. If that be true, I think it safe to say that at least five times that number suffer from infection, in varying degrees, but do not die. Many of them are semi-invalids as long as they live, or soon fall into the hands of the gynecologist. This is a fearful showing, and when we consider that it is nearly always a preventable disease it is a fearful arraignment of the medical profession. That it is a preventable condition is proven by the fact that in well-regulated lying-in hospitals the mortality is almost nil, less than one-fourth of 1 per cent.

All agree that the mortality and prevalence of puerperal infection has not very materially decreased in private homes. This fact, together with the great diversity of opinion as to its treatment, is my excuse for presenting this subject to you at this time.

Something must be done to correct this state of affairs. We know that puerperal infection is simply wound infection due to the presence of pathogenic micro-organisms that are carried from without inward as in any other wound infection. It is true that the pregnant woman, particularly during labor, is peculiarly susceptible to outside germs. These germs gain access in various ways, as by the hands or instruments of the physician, the nurse, the husband, the patient herself, the bedding, or dressings used.

The most important point of treatment in this disease is prophylactic treatment, but I shall not consume your time by going over this in detail. One of the greatest barriers to infection is a healthy woman. This necessitates a more thorough prenatal care of every pregnant woman. By proper education of the people and keeping a proper watch on the woman from the beginning to the end of her pregnancy we can do much to lessen the danger. Proper hygienic surroundings, cleanliness and proper food, with sufficient sleep and rest, will greatly increase her power of resistance by making her a strong, healthy woman.

The management of labor from the beginning to the end is most important. Ideal obstetrics can never be attained outside a well regulated hospital. But the great bulk of labor cases are attended in the home and by the doctor in general practice or the midwife. Fortunately, in this country the midwife is fast disappearing.

The general practitioner is called upon to attend a case of labor while fresh from a case of scarlet fever, diphtheria, erysipelas or the dressing of pus cases. Is it possible to do this in such a way as to reduce the risk to the minimum? It can be done, and I should like to insist that every such doctor take the following precautions:

In his obstetric bag he should carry at all times a sterile operating gown and rubber gloves. Before he makes every internal examination he should take the time to scrub the vulva and surrounding parts with soap and water and then a bichlorid solution. He should make no vaginal toilet and he should scrub the hands and arms with soap and water and then soak them in bichlorid. Next he should don the gown and sterile gloves and make one careful and thorough digital examination. Then he should conduct the labor with just as few examinations as possible. External and rectal examination should be encouraged and will suffice for most cases. The physician should avoid stretching the cervix manually except for cause. He should not rupture the membranes until they have served their purpose. Too early rupture of the membranes predisposes to infection. Prevent lacerations by proper means. If they occur, he should repair them properly in an aseptic manner. After the completion of the second stage, the risk is greatly increased. Too early and improper resort to Crede's method of expressing the placenta is a frequent source of danger, since it favors the retention of portions of placenta or membranes. He should examine the membranes and placenta very carefully. If he finds that por-

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tions are retained he should remove them at once with strict sterile precautions. Except for hemorrhage or retained products he should keep out of the uterus. He should make no vaginal examination for tears, but should make an ocular examination in all cases. After one is sure the uterus is empty and the abrasions and lacerations are carefully closed, a sterile vulval pad is applied and held in place by a well-fitted T-binder. No vaginal douches should be given. All this can be done by the doctor in the country as well as in town or in a hospital, but he will have to do it himself when a trained nurse is not present.

The chief object of my paper, however, is to discuss the proper management of puerperal infection after it has occurred.

The disease is essentially systemic or very soon becomes so and should be treated chiefly by general means. As soon as the offending micro-organism enters the system the protective forces of Nature are aroused and a deadly combat is waged. At once Nature throws out a protective wall of leukocytes to prevent their spread in the system. We should be very careful not to break down that wall by local measures. There are only two ways that we can help to win the fight: first, by the use of means or remedies that will injure or destroy the bacteria after they have entered the system; and second, by strengthening in every way possible the resisting forces of Nature.

At present there is no known means of destroying the bacteria after they pass from the endometrium and not much while they are still confined to the uterine cavity. Intra-uterine antiseptics are of doubtful value in any case and may do a vast amount of harm. Various vaccines, bacterins and serums have been recommended, but they give doubtful or negative results. The first two named are absolutely useless. The antistreptococcus serum is beneficial in some cases when given early and in large doses. Silver salts by inunction, per rectum and intravenously have been used since Crede first called attention to them. Their mode of action is by increasing the leukocytes. I have not been able to recognize any benefit from their use. Normal saline intravenously will act as well and is free from danger. The active treatment of puerperal infection is both local and general. It is the local treatment that is now producing so much difference of opinion and of which I shall speak first. At the present time there are three distinct views in regard to the local or surgical treatment of puerperal fever.

Some hold that the uterus should never be invaded except for hemorrhage; others that the uterus should always be emptied except in the presence of hemolizing streptococci or pelvic inflammatory exudates. Thirdly, others hold that the uterus should always be emptied when products of conception are known to be present, irrespective of the bacterial findings. I am glad to see that the number in the first class is increasing, although it may be a little extreme. The type of infection should determine the local treatment of this condition.

The purely sapremic type, which can usually be distinguished by the clinical findings, should be treated as follows:

The patient should be properly prepared and anesthetized. The sterile gloved hand is then passed into the uterus, the attached debris is gently but thoroughly separated from the entire uterine wall, after which it is removed. The uterus is irrigated with a creolin solution, and thereafter let alone. The sharp curet is an instrument of death which has no place in the treatment of infection at term and very little at any stage of pregnancy. No doubt it has been responsible for many deaths which might have been avoided if the patient had been given a fair chance. Some advise packing the uterus or inserting a gauze wick, but I think this is unnecessary except for hemorrhage.

In the purely putrid type, after the uterus has been carefully and properly emptied, the temperature drops rapidly, the symptoms disappear and the patient makes a satisfactory recovery. If there is mixed infection, there may be a subsequent rise of temperature, but further intrauterine treatment is both unnecessary and dangerous. When we are in doubt as to the contents of the uterus it is better to wait until the uterus has had time to empty itself.

In the septic type, the bacteria rapidly enter the circulation through the lymphatics and pass beyond reach of any local

treatment. Attempts in that direction only break down Nature's wall of defense and open new fields for the rapid spread of the bacteria. This type of infection is essentially a systemic disease and should be treated by general measures. We should bend all our energies to such measures as will increase the resistance of the forces of the body. This is accomplished by proper food and plenty of liquids to dilute the toxins. Sufficient rest, both mental and physical, is important, even if it has to be gained by anodynes or sedatives. Alcoholic stimulation is contraindicated because we need rest, not action.

Put the patient in a quiet room with a competent nurse, with fresh air and sunshine. If the temperature is excessive, control it by sponging and the ice bag over the fundus, which also favors proper involution. Coal tar depressants should not be used. Ergot and hydrastis may be given for two or three days.

In the beginning calomel followed by castor oil is helpful. Later, there is a tendency to diarrhea, which is usually unfavorable and may have to be controlled. In from ten to fourteen days the disease may run its course unless it spreads to other parts of the body. In other cases the bacteria escape along the lymphatics or blood vessels into the pelvic connective tissue, giving rise to a mass of inflammatory exudate. Under proper treatment and with sufficient time this is gradually absorbed. No surgical interference is advisable unless suppuration is demonstrated. It may then be drained through the *cul de sac*.

The treatment of peritonitis, both pelvic and general, pyemia, phlebitis, etc., I have not time to consider.

The point I wish to stress is the great prevalence of this affection despite the fact that it is a preventable disease. I wish to urge better prenatal management of all cases, more strict prophylaxis in the conduct of labor and the puerperum, and to emphasize the great danger of local or surgical intervention in the presence of pathogenic micro-organisms. By observing these things the disease will be very materially lessened and hundreds of mothers left to rear their offspring.

DISCUSSION

Dr. S. J. Gill, Roanoke, Va.—I wish to differ with Dr. Altman in one point, i. e., that antiseptic douches should be used in all cases where there are retained products of conception in the uterus. No instrument should be passed into the uterus on account of the danger of breaking down the wall of protection that Nature has built up. But the soft end of the tube should be passed into the vagina and the lips of the labia majora held tightly around it until the vagina is inflated, thus causing the fluid to back up into the uterus. I have had only one case of pure streptococcic puerperal fever in thirty-five years.

Dr. D. W. Kelly, Winnfield, La.—I put ice over the uterus, give an initial purge of calomel followed by quinin or ergot every four hours by the mouth and give every twelve hours 0.5 to 1 vial of staphylo-strepto bacterin hypodermically. I repeat the serum until the patient is clear of fever. My best results from the bacterin are obtained when it is administered early, though I have obtained good results from this line of treatment after fever was on for a week. Do not use the douche and keep your hand out of an infected uterus. My results when beginning within twenty-four hours after the onset of fever are splendid.

Dr. Otto H. Schwarz, St. Louis, Mo.—The most important feature of any paper on puerperal fever is the part which deals with prophylaxis. In the Washington University Out-Patient Department, to my knowledge, during the last ten years there has never developed any serious case of puerperal sepsis in which the Department saw the case from its beginning. These cases are, for the most part, handled by students and they are particularly instructed in the importance of observing proper aseptic precautions. They are allowed to make vaginal examinations. The good fortune which we have had in these cases is, perhaps, due not only to the rigorous aseptic precautions undertaken, but also to the fact that these students are not handling any infectious cases or infectious material during this time.

It must be particularly emphasized that the man who is in general practice, who is handling infectious cases at all times, erysipelas and other types of infections, if called to an obstetrical case, must use all precautions in the examination of such a patient that a surgeon would employ if he were to open an abdomen. As soon as this particular point is adhered to the dangers of puerperal infection will be reduced to a minimum.

Dr. D. S. Downey, Chickasha, Okla.—I wish to condemn the thoughtless practice of purging these patients. I still find a few men who are trying "to touch the liver and cleanse the tongue" by using daily drastic purgatives. This practice

uses their vital strength and rids the system of poison just about as much, in proportion, as bleeding did in the olden days.

You encourage a general peritonitis by peristaltic whipping of the bowels, whereas if they are permitted to lie quiet the infection may localize. Our practice is to splint the bowel by the free use of morphin and an ice cap upon the abdomen and by using soapsuds enemas for daily evacuation of the bowels. If the abscess localizes in the *cul de sac*, drain through the vagina.

Since this practice our mortality has been greatly reduced.

Dr. W. H. Vogt, St. Louis, Mo.—I was very glad to hear Dr. Altman take a conservative stand in the treatment of puerperal sepsis. The too active treatment of these cases usually does more harm than good. The routine curettage of such cases is generally admitted to be poor treatment.

Regarding the administration of the antistreptococcic serums, I have only this to say: that I have never seen any definite benefit derived from them, though I use them in some individual cases. When used they must be in very large doses if one hopes for any good results at all.

No method of treatment seems to gain universal results and I believe that those cases that recover have been of a milder type. I am satisfied that if we find the streptococcus in the blood stream the case is hopeless to begin with and that any method of treatment would be of no avail. On the other hand, if this is not the case and we have a mild form of infection, Nature perhaps takes care of it without our assistance, except that we may aid the patient in fighting such infection.

Dr. W. A. Fowler, Oklahoma City, Okla.—Dr. Altman rightly lays greatest emphasis upon the danger of exploring and treating the uterine cavity in puerperal fever. It should be resorted to only in cases in which sapremia is clearly indicated and in which there is a discharge that is either very free and foul-smelling or very bloody. All authorities seem to be agreed that if this procedure is resorted to the gentlest possible means should be used and by no means should there be a repetition.

As to Dr. Altman's suggestion that the patient be given ergot in the beginning of this condition, I believe it unwise. The most important factor in the treatment of sepsis is rest, and rest particularly of the infected organ. Ergot will only undo Nature's effort in this direction. When we have the signs of peritonitis the treatment should consist of the Fowler position, nothing at all by mouth, the Murphy drip and morphin for relaxation. This routine will splint the bowels and give Nature a chance to wall off the infection.

Dr. Altman (closing).—If my paper should help to cut down the mortality of this deadly disease, my object will have been attained. I make no claim for anything new.

TREATMENT OF FRACTURES NEAR THE SHOULDER, ELBOW AND WRIST*

By W. W. Harper, M.D.,
Selma, Ala.

In treating fractures near the large joints, one must bear in mind not only the attainment of a good union of the fracture, but the maintenance of perfect joint function. While the joints of the lower extremities are similar anatomically to those of the upper, their function is somewhat different. The joints of the lower extremities are made to bear weight and for locomotion, while the upper have as their purpose complicated movements. It is, therefore, evident that a good functional result in a lower extremity joint might be considered a poor one in an upper.

FRACTURE OF HUMERUS

All fractures of the surgical neck of the humerus should be treated in abduction to overcome the pull of the adductors and to relax the deltoid. The position of abduction is maintained by means of a wooden tripod and plaster of Paris. The arm rests upon one leg of the tripod, while the other leg rests against the side of the chest. The tripod is held to the side by adhesive. The upper extremity, shoulder and chest, are now encased in plaster. This immobilizes the fracture and secures union with good alignment and a minimum of callus.

FRACTURE OF THE ELBOW

The elbow is a hinge joint and its function is to allow flexion and extension. With one exception (fracture of the olecranon) this principle is laid lown: all fractures of the elbow must be treated in acute flexion. The position of flexion is maintained by bandaging the forearm to the arm with a four-inch adhesive. Care must be exercised to provide for swelling at the elbow. The wrist is to be well padded with cotton and then swung from the neck by a bandage.

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*Read before the Southern States Association of Railway Surgeons, Auxiliary of the Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

The after-treatment of these fractures is most important, and for its perfection we are indebted to Sir Robert Jones. At the end of ten days he cuts the adhesive and lets the forearm down ten degrees. He then fixes the elbow in this position, provided the patient can work his forearm in that arc without pain. If not, he returns to the first position for another ten days. Then he drops down ten degrees every ten days until within ten or fifteen degrees of normal, when the bandage is removed and the patient is allowed to use his elbow. If, after two months of use, there is not full extension, the remaining adhesions are broken under an anesthetic.

There is one fracture at the elbow joint that frequently calls for an immediate open operation, and that is a fracture of the lateral condyle. In some fractures of the lateral condyle the broken fragment rotates on itself and becomes interposed between the head of the radius and the humerus. External manipulation usually fails to reduce this dislocation. The only thing to do is an open operation to pry the bone back into place; for if the fragment is improperly reduced, the patient is crippled for life. In this operation it is not necessary to open the elbow joint, as the fracture is just below the skin.

COLLES' FRACTURE

There are a number of doctors who are not familiar with Jones' method of reducing fractures near the lower end of the radius. All should know his method, for by it one not only can at the time do a perfect reduction, but reduction can be effected at the end of a month in unrecognized cases.

Mr. Jones makes this assertion: "A man who walks the floor the first night after his reduction has supposedly been made, has not had that reduction made." In other words, if the reduction has been made the patient will be comfortable. Of course, all patients should be anesthetized.

I recently saw a woman who was supposed to have a dislocation. It was treated as a dislocation. She suffered all the time and came to me at the end of a month. A Colles' was diagnosed. I gave an anesthetic, and with my own hands reduced this one-month-old fracture, applied plaster of Paris splints, leaving out fingers, and told her to go ahead with her work. She was a nurse and continued to nurse the children of the household as she had before the accident. After the reduction there was no further pain and there was a perfect functional result. Having effected a reduction, my rule is to put the forearm in palmar flexion for ten days, then straight for ten days, and for the next ten days in slight dorsi-flexion. Use moulded plaster splints down to the metacarpo-phalangeal joints. Encourage the patient to use the hand the next day. This treatment has given the writer the best functional results.

In fractures of the wrist that are liable to end in ankylosis, the wrist must be treated in dorsi-flexion, as this will give the patient a good grasp if ankylosis does occur.

In the stiff wrists, due to extra-articular adhesions, do not give an anesthetic and vigorously manipulate the joint. The result will be more and firmer adhesions. It is better to do all you can without a general anesthetic, urging the patient to bear all he can. Instead of making many up and down movements, make one continuous pull, stretching everything. Then when the patient can bear no further pull, stop until the next day. Repeat this every day until the result is obtained.

DISCUSSION

Dr. Edward T. Newell, Chattanooga, Tenn.— Dr. Harper speaks of using a triangular splint. That is one I have used for a number of years with a great deal of success, with a slight difference in the lengths. In applying this splint I usually use broad adhesive plaster and strap the splint to the arm, then to the body, all the way round. In going around with the plaster of Paris, with the splint in that position, I do not put the plaster around the splint. I put it more around the arm and over it, around the body in front and in the back. With two pieces of thick flannel attached to it one can pull it up and get more of a shoulder brace. The splint and packing that Dr. Harper has suggested, while it is quite old, is very practical and gives the best results in this condition. It allows a certain amount of motion, and as we all know, if we have a little motion we get better results and better union than where we have complete immobilization. It is for that reason that we get such splendid results here.

The treatment I have been accustomed to use in the elbow is the anterior and posterior molded splint. The Doctor uses a plaster bandage or possibly adhesive plaster. I use the molded splint and a flexion about at right angles. It is

very important that we should have the arm flexed at least to right angles, because if we do get stiffness, which we are liable to have in an injury of this joint or any other joint, we have the arm in a position where it can be used. The patient can dress his or her hair, can wash the face, and can eat.

We also know that there is a great tendency to draw the arm downward; that the posterior muscles are more powerful, and the tendency is to have an arm in extension. If it is in partial extension it is of very little functional value. So if we put the arm up in flexion and keep it there, if we get a stiff joint or partially stiff joint, we have quite a serviceable arm.

In regard to placing the patient under anesthesia for breaking up adhesions, etc., I believe the Doctor meant to stress the point particularly that he was not very much in favor of forcibly breaking up adhesions and callus formations, because they frequently form again. It would be much better to resort to hydrotherapy and massage under a competent person. It is much easier to get motion if you have the arm up and work it down than it is if you have it down and try to work it up. So if you have it up let it down only about ten degrees, as the Doctor suggested, and if it works well there, and good motion is obtained, you can continue to increase the angle from time to time.

There are, of course, many ways of setting Colles' fractures. There is the Jones method. But the old method which I have used is the "shake-hands" method. The patient is under anesthesia. Usually the distal fragments are posterior and the proximal underneath. First, increase the fracture. Then as you come to the fracture line, slide down with the thumb the posterior displaced fragment. I find it to be better than the Jones method. Take hold of the right hand with your right hand or the left with your left, and grasp the other arm with your hand, using your knee as a fulcrum.

Using the fluoroscope, we stand a better chance of getting good results. I do not mean that the fluoroscope is 100 per cent perfect, but it is of great assistance. Where possible, all fractures should be x-rayed before setting them, fluoroscoped when you set them, and x-rayed after the setting. Possibly other radiograms should be made later to note the progress. The fluoroscope will give great assistance in setting. One can look at the fracture and see if there is good approximation of the fragments. Even though it be not perfect, one may be satisfied that with the approximation and with the alignment obtained there will be a good enough result. Often there is a fairly good approximation, but we go on trying to do better and end by doing worse. The fluoroscopic examination at the time is of great value.

Dr. T. H. Hancock, Atlanta, Ga.—The Jones method of reducing a Colles' fracture can possibly be used by Dr. Harper. He has short fingers and a powerful grip. I am the strongest man around my district, but I cannot reduce these fractures by the Jones method. The wrist must be put in extreme extension before the reduction can be made.

Prof. L. S. Pilcher was the one who first described the reduction of this fracture. He says you must bring the hand and wrist back and make the traction with it in extreme extension. You do not have to break it worse.

Dr. W. S. Anderson, Memphis, Tenn.—In fractures of the elbow joint it has been my practice to put the arm in acute flexion, that is, in the Jones position. I do that for two reasons. If perhaps we should get an ankylosis there in the acute flexion, the patient will have more use of the arm and can feed himself. If we get an ankylosis with the arm in probably the right angle position, it is very difficult to use the arm to any advantage. By putting the arm in the acute flexion we get relaxation of all the ligaments, and thus the fractures are easily kept in position.

In Colles' fracture the secret of success is proper reduction at the time. After this reduction has been obtained any type of splint can maintain it there. If that is done, then the secret of proper joint flexion is manipulation of the joint. The secret of all fractures is, if possible, to get an early passive motion of the joint and thus a flexible joint.

Dr. Isidore Cohn, New Orleans, La.—In referring to the triangle, Dr. Harper has described part of the treatment suggested in a paper read before the Section on Surgery of the Southern Medical Association in 1913 and afterward published in the JOURNAL. Dr. Harper did not stress sufficiently the importance of maintaining external rotation. The deltoid abducts the elbow contraction of the biceps and triceps, actually shortens the arm and the proximal end of the distal fragment, that is, of the shaft, is brought closer into the chest by the action of the pectoralis major and latissimus dorsi. The pectoralis major, in contracting, has a tendency to adduct the arm. That being favored by the abduction of the elbow by the deltoid, allows not only the adduction of the shaft but the internal rotation as a result of the contraction of the latissimus dorsi. In order to maintain abduction and external rotation, it is necessary to immobilize the elbow as well as the shoulder. Immobilization of the elbow not only maintains abduction and external rotation, but it avoids and overcomes the action of the biceps and triceps which have a tendency to produce an overriding deformity.

In order to prevent the triangle from sliding backward, as it may do, we bring our plaster through the one angle of the triangle and instead of going forward with it, simply bring it back in the opposite direction. That prevents the triangle from going forward. The inner side of that triangle should extend down to the iliac crest. We should have as much abduction as we possibly can. It is important to remember about getting external reduction.

Recently I have reviewed the experience with elbow fractures in our Clinic for the last ten years. It is important to know that you cannot reduce these just by hyperflexion. To reduce the deformity, hyperextend the elbow and make trac-

tion and countertraction. This will enable you to increase the distance between the shaft and the lower fragment and then hyperflexion is easy enough.

In fractures of the lateral condyles, supination is the position, because from the lateral side of the shaft of the humerus and the lateral side of the lower end of the humerus we have attached our supinator longus, particularly. If we pronate the arm we have a deformity, because the muscles which originate from the medial condyle are contracting and pulling the lateral condyle away from its place. Therefore, in fractures of the lateral condyle complete supination is the position. In fractures of the medial condyle, on the other hand, if we have complete supination, the supinators contract more and this has a tendency to aid the pronator to pull the medial condyle away from the shaft.

It is important to remember that in the wrist you do not need to wait until ten days afterward to find out that the patient is going to have complete functional results. E. H. Skinner, of Kansas City, describes a very efficient method. We have planes passing through the middle of the long axis of the shaft of the radius and at right angles to this a perpendicular is dropped from the tip of the ulna styloid. More than half of the base of the radius should be below the intersection. Under those conditions, if we have that in the picture, we can be well satisfied that unless the patient is immobilized too long, we shall have good results.

Dr. T. E. Abernathy, Chattanooga, Tenn.—In a fracture of the shoulder where the head of the bone is broken off and rolls, which it does as a rule toward the outer aspect of the shoulder, it is necessary to have extension and counter-extension to get it into place. The triangular splint is all right in many cases, especially if the bone is broken below the surgical neck in the shaft. But where the head of the bone rotates at the fracture, the only way that it can be kept in place is by extension and counter-extension such as you would put on the femur. We had a case not long ago of that character, and first put it up with the old-fashioned, wedge-shaped splint, which somewhat resembles the triangular splint. We x-rayed it. It would not stay in place. We tried different methods. Finally we put the patient to bed on her back, took a plank about a foot wide and laid the arm out that way with considerable extension and left it there two weeks. We x-rayed it in the meantime. At the end of two weeks the bones were in perfect apposition, the arm being straight out. We left it there for about a week, put it in plaster of Paris in that position and left it there for a month. We then took it down. After two months she had good use of the shoulder. There is no ankylosis and there is almost perfect function of the joint. I believe that is the best way to correct fractures where the head of the bone is broken off.

Dr. W. H. Blake, Sheffield, Ala.—There is a fracture just above the elbow that does not include the joint. We have very little trouble under the fluoroscope, possibly, in reducing these fractures, but we do have trouble in holding them in position until our plaster splint hardens. I have a piece of five-eighths iron rod crooked. It comes down several inches below the elbow and goes several inches above the shoulder. I flex the arm at right angles and place plenty of padding just in front of the elbow. Over that I put with plenty of padding an ordinary piece of tin, which is bent to fit the arm. The tin is imbedded in the dressing and it must be comfortable after the dressing is applied. Then with a loop of gauze passing beneath the axilla and fastened to the end of the iron rod, which is entirely out of the way, and another piece passing over the carved piece of tin and attached to the loop at the lower end of the bent rod, which is extended by a screw, under the fluoroscope I turn the screw until I get the fracture in apposition. Then I place on plaster, fitting it snugly under axilla and over the tin in front of the elbow. The extension and counter-extension which holds the fracture in place must be against and under the arm. The whole device is to overcome the difficulty we have in holding the fracture in apposition while the plaster hardens. The whole reason for the tin is to avoid discomfort by distributing the pressure in front of the elbow. I pad it thoroughly and make the dressings as loose as I can to hold the fractured bone in position.

Dr. Duncan Eve, Nashville, Tenn.—I have nothing to suggest. The plan I always use is Levis' formula for reduction. There are three well known formulas: the one that Dr. Harper uses, the Murphy method, and the Levis plan. Pilcher did show that in a fracture of the lower end of the radius there was a portion of the dorsal periosteum that acted as a binding band and held the fragments in deformity, but Dr. Levis proposed to relax this dorsal periosteum in order to reduce the fracture.

I agree with Dr. Harper that no fracture, especially of or near a joint, should be reduced except under anesthesia.

The Murphy plan requires much strength in one's thumbs or fingers, while the plan of Levis is readily performed in three motions. First, make dorsal flexion carrying the hand well back upon the forearm (hyper-flexion) to relax the dorsal periosteum. Then traction is made to separate the fragments and finally force flexion to engage the fragments in reduction. You can always determine whether a Colles' fracture is reduced by finding out if the patient can flex his hand normally. Any plan of immobilization will answer if you begin passive movements early. You can use an ordinary shingle. You can use, as I frequently do, the Bond splint, which gives semi-flexion of the wrist and semi-extension of the fingers, making the patient very comfortable.

I make my patients, particularly if they are beyond fifty years of age, use hot water and play ball, as I call it. I have them get an ordinary soft rubber ball and amuse themselves by almost continuously moving the fingers. This prevents ankylosis. There will be no deformity in a Colles' fracture if it is properly reduced.

INFECTIONS OF URINARY TRACT WITH REPORT OF 400 CASES*

By Edward Clay Mitchell, M.D.,
Memphis, Tenn.

The purpose of this paper is not to offer anything new, but to bring forward for discussion some of the clinical facts and to show our finding in an analysis of 400 cases covering a period of approximately twelve years in both private and hospital practice.

Since the first discussion of this subject, under the caption of coli-cystitis, by Escherich in 1894, much has been written upon this subject. Many theories have been advanced and contradicted, but as there is no condition in pediatrics more frequently met with, we must dwell upon it again and again in order to recognize it. In this section of the country we are often mistaken because of this condition.

ETIOLOGY

This condition may be produced by any of the pyogenic organisms, but as first stated by Escherich the colon group is responsible for by far the greater number of cases.

As to the general etiology, our cases showed 68 boys and 332 girls, indicating a preponderance in the female of approximately 83 per cent.

For etiological classification, the cases are divided into three groups:

(1) Primary pyuria, in which from the history and findings no factor was demonstrated to explain the pus in the urine with its attendant symptoms (42 cases).

(2) Secondary pyuria, or those cases in which there was some other condition predisposing to the pyuria, or those cases secondary to some infectious process elsewhere. Following infectious diseases, or where a focus of infection could be demonstrated (829 cases).

(3) Those cases in which pus was found in the urine on routine examination with no seeming clinical bearing upon the course of the disease (69 cases).

*Read in Section on Pediatrics, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

MODE OF INFECTION

As to the mode of infection there is much controversy. The great preponderance of girls over boys would seem to indicate that the ascending method of infection or direct contamination from the genitals, urethra, bladder, ureter and pelvis does occur.

Thompson, in an article in 1917 in the British *Lancet*, gives this as the most common mode of infection. Others claim that it is not possible for the germ to travel up stream against a column of fluid.

I. A. Abt, of Chicago, explains that the organism probably does not travel through the lumen of the urethra, bladder or ureter, but that it ascends through the peri-urethral and peri-ureteral lymphatics. The peri-urethral sheath plays an important part in transmitting the infection upward. It has been shown that there is free communication between the lymphatics of the bladder and the ureter and that the lymph current is in an upward direction. We may still assume, however, that when the ureter is obstructed by calculus, stricture or external pressure, urinary stasis occurs. And, then infection is possible through the lumen of all or one of the urinary tubes.

The amount of tension upon the kidney seems to play an important role, as the freely movable kidney often suffers congestion both because of the kinking of the ureters and tension upon the vessel, with infection following. This is often relieved by putting the patient to bed and allowing the kidney to assume a more normal position.

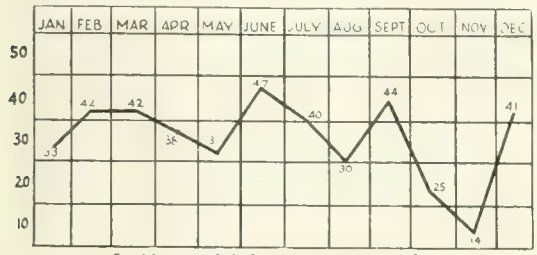
Another method of infection and the one most commonly accepted is by the vascular and lymphatic route following either a general infection, as shown in 121 of our cases; or from a focus outside the genito-urinary tract, particularly the tonsils, as shown in 105 cases.

It has also been shown that the right kidney is more often affected when the infection is unilateral. This is explained by the fact that there is more direct lymphatic connection between the colon and the right kidney, and hence the theory that the bacteria pass directly from the intestine to the kidney by these lymphatic routes.

PREDISPOSING CAUSES

Kowitz makes the statement that these infections are often a direct result of previous intestinal involvement. He prints a most suggestive incidence curve showing that the majority of his cases occurred during the months from July to November. In this climate, where we probably have the worst type of infantile diarrhea of any part of the United States, our incidence curve was as follows:

The greatest number of cases occurred in June and July, the months in which intestinal infection is most common. The second greatest incidence occurred in September and in February, probably the months in which contagious diseases and infection are most prevalent.



Incidence of infection as to month.

EXAMINATION OF THE URINE

A routine examination of the urine is almost as important in a proper summing up of a case as is the examination of the nose and throat and the use of the stethoscope. If we so consider it we shall probably avoid many mistakes.

Negative Findings.—Perhaps these infections are so often overlooked because of the difficulty in obtaining a specimen. Even after the specimen is obtained there are many points to be considered before a diagnosis of pyelitis can be made. The absence of pus but the presence of epithelium in any quantity should lead us at least to make further examination.

One negative urine does not mean freedom from pyelitis. Often repeated examinations are necessary. The urine is most often clear when the symptoms are most severe. With a remission the urine is often found milky with pus.

Positive Findings.—In the male, an uncentrifuged specimen, usually acid in reaction, containing several pus cells to the field usually in clumps with some bladder or kidney epithelum, means pyelitis.

In the female, the simple finding of pus even in quantity (especially is this true after a previous infection), should be looked upon with suspicion, as vulvo-vaginitis is by no means rare. Catheterizing under aseptic conditions is not dangerous and is the surest way of making the diagnosis in the female.

SYMPTOMATOLOGY

This will be very briefly touched upon in this paper because of the wide range and the many guises it assumes.

It varies from the infant who, though seemingly taking sufficient food on properly balanced rations with good digestion, loses weight, and is very restless, particularly at night. He may develop a pallor that is one of the striking symptoms, and this of itself will lead the experienced physician to consider this possibility. Then we have the more severe case, in which we have the high fever, sometimes ushered in by a chill or occasionally even convulsions. This fever may be intermittent or remittent in type, and may extend over a period of weeks. There is usually anorexia. Sometimes there are the symptoms of meningitis. In some of the severe cases jaundice of the intense variety is seen, as reported in three of our cases.

As a result of the loss of appetite and the severe infection, inanition appears. The picture of the decomposition of Finklestein is shown.

The physical examination is usually without manifest finding. Usually there is little tenderness over the bladder or kidney.

Sometimes enlarged kidneys may be palpated and tenderness elicited.

Genito-urinary findings are not present in a large percentage of the cases. Sometimes there is a cry of pain, or shivering is manifested before urination. In some of the severe cases, the pain resembles renal colic, probably due to kinking of the ureter or blocking of the ureter by pus.

PROGNOSIS AND COURSE

The disease ranges from a complete cure with one short attack to the cases lasting over a period of years and proba-

bly, as stated by Quimby, of Baltimore, never to be cured, but to recur in adult life. Particularly is this seen in pregnant women.

CHART SHOWING COURSE OF DISEASE

Under 3 months	38	
3 months	60	
6 months	48	
1 year	89	
2 years	30	
3 years	20	
6 years	8	
12 years	15	
		308
Not followed	29	
Still running	26	
Relapses	37	
Cured	216	
		308

In these cases seven deaths occurred at the time of this infection, but due to some primary infection.

Many authors claim that a freedom from pus does not mean a cure, but the urine must be culturally sterile. We have considered cured those cases found free from pus and culturally sterile.

TREATMENT

The diatetic treatment consists first and foremost in combating the anorexia. Infants suffering from this disease should be forced to take enough food to prevent inanition. On account of the widespread opinion among mothers that an infant should not be forced to take anything that he does not want, this part of the management sometimes is difficult, and often there is great objection to water as well as food.

According to Smith, of Boston, the one form of treatment against which no voice has been raised is the administration of large quantities of fluid. So the main thing is water.

In some instances the gavage is necessary. Fluid is often given per rectum by the drip or high rectal irrigation, but as the rectum soon fatigues and local irritation occurs this is not of great value. In the more severe cases, hypodermoclysis or even intra-peritoneal transfusion has been resorted to.

Infants at the breast should never be weaned, as the breast milk is particularly adapted to conserve the power of resistance and combat infection.

Whatever the germ or germs causing the infection, the objects aimed at are:

(1) To promote good circulation in the kidney.

(2) To prevent absorption of toxins or microorganisms from the intestines.

(3) To establish free drainage.

(4) To modify the character of the urine.

To promote good circulation, tension on the kidney is often relieved by rest in bed. Sometimes digitalis and other drugs are recommended for the poor circulation.

To prevent absorption of toxines from the intestine the bowels should be kept freely open. There is no specific diet except a bland, nourishing diet, constantly remembering the danger of inanition. It is usually well to limit the sugar, if possible. Sometimes yeast and lactic acid bacilli are recommended.

To promote free drainage one should use plenty of water to dilute the urine and wash out effectively any debris, bacteria, pus, etc., which may be collected in the pelvis of the kidney.

Modification of the character of the urine is attempted in order to make a poor medium for bacteria growth. On this most of the treatment has been based and much has been written upon it. Quimby, of Baltimore, gives a long dissertation upon determining the type of bacillus present. Determining the range of the hydrogen-ion concentration exhibited by the culture of the infecting organism taken from the urine were tried. Similar observations were then made upon the urine. Comparison of these two factors then determined in which direction the reaction of the urine should be adjusted so as to create conditions least favorable to the organism.

This view was discussed by Helmholz, who said that what we wish to determine was not the hydrogen-ion concentration of the culture medium after the organism is grown, but to get a medium in which the organism will not grow at all. He found that of twenty cases, in nineteen the range was from 2 per cent bacteriologic acidity to 2 per cent bacteriologic alkalinity. I think that these experiments have brought

out the point emphatically that there is no specific treatment, and that one case may do well on alkali while another may fail. The organism in each case must be studied and each case treated as an individual.

The alkaline method is the one most in vogue. Large doses of potassium citrate are given over a period but not continued too long, as a severe attending diarrhea sometimes results. Also some claims are made that after a time the organism will grow rapidly again in alkaline media. On this basis others recommend that the urine be made alkaline; then by means of acid sodium phosphate or benzoic acid switched rapidly to acid, and vice versa for two or three times.

In our cases a larger percentage, approximately 90 per cent, were treated by the potassium citrate method, giving up to one hundred or more grains a day. A quantity of water was used with good results. Guaiacol, sodium citrate and other forms of alkali have been recommended. Urinary antiseptics are recommended, and particularly hexamethyltetramin, or urotropin, has many adherents.

Still, of London, especially recommends the use of large doses of hexamethyltetramin and speaks highly of its use when given. The urine should always be rendered acid when this drug is used.

Idiosyncrasies to this drug are not uncommon. Sometimes evidences of acute inflammation, as red cells and even occult blood, follow even small doses. Long-continued use in large doses if not well diluted by large quantities of water, will produce the same results. Salol is likewise recommended.

Urinary antiseptics have not proven particularly valuable in our series.

Cystoscopy, ureteral catheterization and washing out of the kidney with the various silver salts, particularly 0.5 to 1 per cent silver nitrate, were employed in twelve cases. Also, in one or two other cases, 1 per cent aluminum acetate was used. These methods were resorted to only in a few cases which had extended over a period of several years and were resistant to all other forms of treatment. In these cases 80 per cent showed no improvement. In 20 per cent of the cases improvement was shown after the first treatment. In 10 per cent of cases improvement was shown only after three or more treatments at intervals of ten days. In no case was the improvement permanent. In all cases relapse was shown.

As to the use of vaccines, the stock vaccine has proven of no value. As to the autogenous vaccine, we are still in doubt. We have tried it in 65 cases. At times there has seemed to be improvement and we grow enthusiastic, but I believe the case that reaches the stage where vaccine is necessary has at least in our series usually relapsed after a time.

Focal infection and its eradication, particularly the tonsils and sinuses, has proven of great value. In twenty-one cases we have located the focus of infection in infected tonsils and the pyelitis has cleared up entirely even in cases which were absolutely resistant before.

ETIOLOGICAL FACTORS IN SECONDARY CASES

Contagious diseases	26
Tonsils	98
Intestinal	123
Malaria	10
Skin infection	3
Jaundice (cause not determined)	3
Respiratory diseases	12
Nephritis	10
Syphilis	3
Rat bite fever	1
Exstrophy of the bladder	1
Encephalitis epidemica	2

APPENDIX—CULTURAL CHARACTERISTICS

Staphylococcus aureus	24
Bacillus pyocyaneous	15
Streptococcus (non-hemolytic)	5
Streptococcus	8
Colon	106
Pneumococcus	18
Streptococcus hemolyticus	7

Of the 400 cases reported, 183 were cultured to ascertain the organism causing the infection.

SUMMARY

In summing up, I should say the lessons we have learned from our analysis are:

(1) Routine examination of the urine should be made in all acute febrile conditions in children, as early recognition and prompt treatment are of first importance.

(2) There is no specific treatment. Treat each case as an individual.

(3) Large amounts of fluid should be given in every instance.

(4) Search for all foci of infection.

(5) The alkaline treatment has succeeded best in our series, but is by no means infallible.

(6) Intestinal antiseptics, pelvic lavage and vaccines are of secondary value, and should not be discarded where the other methods have been tried and found valueless.

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DISCUSSION

Dr. J. Ross Snyder, Birmingham, Ala.—I do not think that Dr. Mitchell need apologize to the Section for presenting what he calls a trite subject. It cannot be called trite until we settle a great many points concerning pyelitis. The experience I had in the Children's Hospital, in Birmingham, last summer made me believe that almost every child with a febrile condition has pyelitis. We make routine examinations of the urine, taking the calculations of Richard Smith, who said that any female child whose urine showed more than three pus cells to the ordinary high power microscopic field should be called a case of pyelitis, and a boy with more than two should be called a case of pyelitis, we have an amazing number of pyelitis cases. I think we shall have to work them out on a more accurate basis, otherwise there will be an enormous percentage of children who, with no other clinical sypmtoms, will show on urinary examination some infection of the pelvis of the kidney.

Another thing that we ought to explain and must explain is why during or before the sixth month the condition effects boys more frequently than girls and after the sixth month girls more frequently than boys. So far we have not explained this phenomenon. Then there are the several theories of the mode of infection, whether it be ascending, or directly through the blood, or through the lymphatics. None of these questions has as yet been satisfactorily settled. It is true that no experimental work has been done that would definitely prove that the ascending nouse is the one usually found. At present from my experience I believe that this is the one usually involved. The most severe case of pyelitis I ever had was in a boy five years old who had an abrasion on his penis for which the mother applied carbolated vaseline, and following that he had the most severe symptoms develop. He ran a temperature varying from subnormal up to 107° every day. He was toxic and very ill and the urine heavily laden with pus, but he got well with no evidence of destruction of the kidney tissue that we could find. I believe the infection was confined to the pelvis of the kidney. He was a severely and critically ill boy. Undoubtedly that case and cases following diarrheal conditions find their mode of infection through the ascending tract.

Dr. Frank C. Neff, Kansas City, Mo.—During the last year I have seen two cases of pyelitis in the new-born, both cases boys, in the first few days of life with high temperature and urine loaded with pus. That point makes me feel more than ever that it has to be considered in the new-born when they have these obscure fevers that we sometimes call inanition fever in the early days of life.

Another thing Dr. Mitchell mentioned is the question of technic in securing the specimen. It is necessary in little girls especially to make a vulvar inspection for pus. If there is pus on the external genitals one should always get a catheterized specimen. In boys, if there is a normal meatus we are satisfied to take the specimen voided in the ordinary way.

Dr. Robert A. Strong, Pass Christian, Miss.—Just a point in regard to the question brought up by Dr. Snyder as to just what quantity of pus would have to be present in the urine in order to warrant our pronouncing the case a pyelitis. That is a thing that has been in doubt in my mind also on some occasions. In this connection I recall that there was a device some years ago which was known as a Delafield D-field. It was intended to be attached to the stage of the microscope and it was used in the same way as a counting plate is used. Delafield suggested that all cells above a certain number would be suggestive of a pyelitis. This little device fell into oblivion perhaps because we wanted to decide for ourselves, as I think we do now. Whether it had merit or not I do not know, as I have never used it. Perhaps some one here who has may enlighten us. At any event, I believe we have to consider both clinical and laboratory findings. With reference to the mode of infection, I have never considered the ascending route of infection as having to travel up stream in the true sense of the word. It does not require a great flight of the imagination to think of a bladder filled with urine, laden with pus and bacteria. This urine with great quantities of B. coli is dammed back into the ureter and the pelvis of the kidney particularly in a reclining position, and is, of course, the same urine thoroughly mixed. I have never thought of it as having to flow up stream against a current, so to speak.

Dr. W. M. Taylor, Oklahoma City, Okla.—In view of the fact that these cases so often develop following acute infections in children, and knowing that no doubt many times the tonsils are infected to some extent, it looks very strongly in favor of this condition's being a secondary infection. Just how the infection reaches the kidney is hard to tell. It must be through the blood in

a number of these cases if it is a secondary infection.

Dr. John Zahorsky, St. Louis, Mo.—You know in girls vaginitis is an extremely common thing, not only the specific types but other forms. We have not felt justified in private practice in catheterizing little girls who have some pus in the urine. So we have added this procedure to our technic: we take some secretion from the vagina. You cannot always tell by looking at it whether it is pus or not. In the severe cases of vaginitis, of course, you can, but there are many mild cases of vaginitis in which there is a good deal of cellular discharge which you cannot easily recognize. We take a pledget of cotton on the tip of an applicator and insert it into the vagina. The secretion is mixed on a slide with a drop of water. If this shows a large number of leucocytes the pus is probably from the vagina. If we find no pus in the vagina or very few pus cells, we are perfectly satisfied to take the evidence of the urine that is passed in the ordinary way.

Dr. W. McKim Marriott, St. Louis, Mo.—I wish to mention one theoretical and two practical points in the treatment of pyelitis. As to the theoretical, it is supposed the reason for giving alkalies is that an alkaline urine is not a good culture medium for the colon bacillus. As a matter of fact, the colon bacillus grows better. The reason, therefore, for giving alkali is not to kill the germ, but to render the urine less irritating to the tissues of the bladder or kidneys.

As to the use of alkali in the treatment of pyelitis, potassium salts was mentioned as a method of choice. Potassium salts are very toxic. The reason they do not usually produce a toxic effect is because they are quickly and readily eliminated. It has been shown that in the presence of nephritis potassium salts do exert that toxic effect. Therefore, these salts should not be given in cases of nephritis. I have seen cases of potassium poisoning in cases of pyelitis. I think it is better to use sodium citrate or bicarbonate. It is just as effective and less dangerous.

In regard to the use of hexamethylenamin or urotropin, the value of this is particularly in those cases where there is only a bacilluria. Hexamethylenamin is of less value when the infection has invaded the tissues. In the earlier stages it is indicated. The volume of urine passed by an infant is very large in proportion to the size of the infant. An infant may pass 25 or 30 ounces of urine a day, or even more. That approaches somewhat the volume of urine of an adult. In order to give enough hemamethylenamin to render the urine antiseptic we must approach the dose given an adult. Doses of one grain are useless in the treatment of pyelitis. We need to give at least five grains three, four or five times a day to an infant. We may get a hematuria, but the bactericidal result would be nil unless we give at least that amount.

Dr. Mitchell (closing).—I realize the difficulty of saying just when a baby has and when it has not pyelitis. Therefore, I call all infections of the urinary tract or pus in the urine pyelitis, and classify them as cases in which we have pus in the urine secondary to diseases in which we find pus, and those in which we found pus in which we thought pus was accidental. That is as far as we can go now. Regarding the use of hexamethylenamin, I notice Dr. Still, of London, in an article some years ago recommended very large doses, as high as 10 or 12 grains in older children, though he mentioned the point Dr. Marriott spoke of, that it would produce blood in the urine and irritation.

REPORT OF A CASE OF PAPILLOMA OF THE PELVIS OF THE KIDNEY*

By O. S. McCown, M.D., F.A.C.S.,
Memphis, Tenn.

The detailed reports of papilloma of the kidney pelvis are few, which indicates the rarity of the condition. P. E. McCown,[1] of Indianapolis, reported one case last year before the Urologic Section of the American Medical Association and reviewed all the case reports available in the literature at the time his paper was written. There were only ten American and thirty-eight foreign cases, making a total of forty-eight recorded cases.

Since Dr. McCown's paper two cases have been reported by Dr. Wm. C. Quinby[2] in the *Journal of Urology* and one by Miller and Herbst[3] in the *Journal of the American Medical Association.* These, with my case, bring the number reported in detail to date to fifty-two. In addition to these full reports, Braasch says, in discussing Dr. McCown's paper, that The Mayo Clinic has had three cases since the one reported by Judd and in the same discussion, others mention cases seen. The condition is probably of more frequent occurrence than the few reports would suggest but it is still rare. It is important, however, because it is always a potentially malignant condition whether or not so classed microscopically in any given case.

Hematuria is the most constant and usually the earliest symptom. Unfortunately this is painless and often intermittent, both of which tend to make the patient, and perhaps the doctor, procrastinate; and time is the essence of safety. There is but one bilateral case reported.

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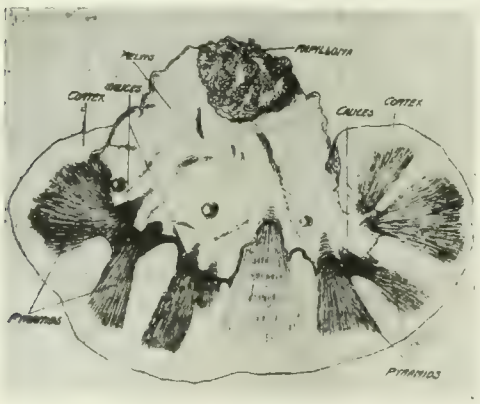
*Read in Section on Urology, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

Hence, unilateral hematuria is significant, and unilateral hematuria accompanied by papilloma of the bladder, as stated by Braasch, is so strongly suggestive of papilloma of the kidney pelvis as to be almost diagnostic. Frequent, painful urine sometimes accompanies the hematuria, and renal colic may result from obstruction by the tumor or clots. There was a mild colic in the case reported in this paper, probably due to the location of the tumor at the pelvic outlet. Of course, every diagnostic measure should be used to eliminate tuberculosis, stone, etc., as a cause of symptoms.

The presence of a palpable tumor is necessarily a late finding, making the chance of cure very remote, and a diagnosis sufficiently clear to justify operation should be made before this stage is reached.



Drawing of papilloma of pelvis of kidney. Kidney drawn with outlet above. Two centimeters of ureter were removed beyond tumor attachment, but it does not show in drawing.

The papers of Herbst and Miller, Judd, Quinby, and McCown with the discussion on them develop the important clinical fact that there is a positive tendency for papilloma of the pelvis of the kidney to extend to the ureter and the bladder, which suggests that nephrectomy with ureterectomy is the operation of choice, and all are agreed that recurrences in the bladder should be treated by fulguration.

Judd[4] states that the tumors in the pelvis are almost always multiple. This is probably often the result of multiplication by extension from an original single tumor. The case reported here was evidently of short duration and there was only one tumor present.

CASE REPORTS

A white woman, a widow, age 72 years, was sent to my office on March 5, 1915, by Dr. E. D. Mitchell, of Memphis, for urologic examination and consultation. She was the mother of two children, and had had no birth injuries. She had had no previous illness of consequence. Six months before she was seen by me she began to pass bloody urine, at first intermittently, but for a month hematuria had been constant with increased frequency and burning pain on voiding. X-ray of both kidneys, ureters, and the bladder had been made by Dr. Mitchell and found negative for stone.

Examination showed a woman fairly vigorous for her age, without special physical findings. The urine was dark brown. Cystoscopic examination showed a normal bladder, which easily retained 250 c. c. of fluid. The urine from the right kidney was very bloody and could be seen coming from the ureter in normal spurts. No. 6 catheters were easily carried to the pelvis on each side. There was a normal flow of normal urine from the left kidney. The specimen from the right kidney was very dark, containing much blood and epithelium. Both kidney specimens failed to produce a growth on ascitic agar or blood serum. The phenolsulphonephthalein output from the left kidney was 40 per cent in two hours. No tubercle bacilli could be found in either the kidney or bladder specimens. Pyelograms were not made.

The patient was returned to Dr. Mitchell with a tentative diagnosis of renal tumor, and nephrectomy was advised. This was done by Dr. Mitchell on March 8, 1915. An oblique lumbar incision was made and the kidney lifted into the wound. It was free from adhesions and normal in appearance except that the pelvis was distended by a soft mass. Nephrectomy was done. On opening the kidney, it looked normal except that the pelvis contained several ounces of clotted blood and the tumor shown in the picture was seen at the pelvic outlet. The dilatation of the pelvis was apparently acute.

The pathologic examination of the specimen was made by Dr. H. T. Brooks of the pathological department of the University of Tennessee, and his report is as follows: A single papilloma of the pelvis of the kidney was found measuring 1.5x2 cm., growing from the kidney pelvis from a small pedicle attached near the outlet. The tumor was made up of connective tissue stalks with blood vessels and superimposed layers of epithelial cells. There was no effort at invasion of the mucous membrane or other evidence of malignancy. The diagnosis is benign papilloma of the kidney pelvis. The kidney and pelvis are normal except for the tumor.

The patient made a good operative recovery and there was no more hematuria. She remained well for three and a half years, then began suffering with frequent painful urine. This gradually grew worse until she consulted me again six months later. At that time she was voiding almost every hour, day and night. The urine con-

tained pus. There were no evidences of tumor recurrence or of metastasis. The bladder would retain only about two ounces of fluid and on cystoscopic inspection the mucous membrane had the appearance of a chronic cystitis. There was much trabeculation, and no visible tumors or ulceration. The patient was getting rather feeble though able to come to my office. (She was then 76 years old). She was made more comfortable and the bladder capacity increased by irrigations with boric acid solution and instillations of 4 per cent silvol. She died very suddenly from hemmorrhage from the mouth four and a half years after the nephrectomy. This hemorrhage came without warning while she was up and walking about the house. Death resulted in a few minutes. There was no autopsy and no means of determining the source of the fatal hemorrhage.

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REPORT OF A CASE OF CORNU CUTANEUM

By F. R. Crawford, M.D.,
Southern Presbyterian Mission Hospital,
Kashing, China.

The case herewith presented seems of sufficient interest to warrant its being placed on record. Judging from the statements of such text books as are available it is a rare condition. Also the majority of those reported seem to have been much smaller, though on the other hand a number were much larger.

CASE REPORT

The patient, a Chinese farmer, Hospital No. 22-709, was thirty-eight years old and single.

His father and mother were both dead, cause unknown. He had one brother living and well.

His personal history was unimportant save for the present illness.

He stated that for twenty years he had had a tumor on the left side of his face. This had grown slowly. About one year previous to admission to the hospital, the skin over the center of the tumor became inflamed and broke, with the discharge of a small amount of thin, seropurulent material. From his description this lasted only a few days and was followed by the gradual growth of the tumor which assumed its form when seen. He stated that prior to the breaking of the skin he had noticed no change in the consistency of the tumor, simply that the skin had become inflamed.

On physical examination the man presented nothing of interest except the tumor and horn. He was well nourished, rather above the average in intelligence, and his heart and lungs were normal. There was no enlargement of the cervical glands.

The central portion of the left cheek was occupied by a large tumor mass. Springing from the center of this tumor and with its diameter nearly equal to that of the tumor, was a large horn. The tumor was slightly irregular in outline, nodular, but soft. The skin over the tumor just at the base of the horn was somewhat inflamed, and there was a slight sense of fluctuation. The skin was not infiltrated. Just at the base of the horn the mass measured eight and three-quarters inches in circumference. Measuring over the convex surface, from the cheek at the base of the tumor to the tip of the horn, was six and one-quarter inches. The horn was curved downward, suggesting the action of gravity. The tip and under surface appeared to have been broken off; this, however, the patient denied. The horn was hard, resounding on being tapped with a pencil. It was brown in color and presented a roughened, striated appearance. (The shape, the broken end and the striations show up well in the accompanying photograph.)

Operative Note (day after admission).—Under ether anaesthesia, a circular incision was made well into the healthy skin below the margin showing inflamation. The skin fell away from the tumor practically without dissection. Following the line of cleavage the tumor was lifted out very easily. The skin was undercut, the redundant portions trimmed away at the corners of the wound and the whole closed in a straight line. Drainage was used.

Postoperative Note.—There was a slight separation of the central portion of the wound. This delayed healing for a few days. The patient,

however, made a rapid recovery and was discharged on the thirteenth day.

The accompanying photograph shows the general appearance of the condition much better than it can be described. Grossly the tumor presents every appearance of being a large sebaceous cyst. It was very definitely encapsulated, and came away perfectly clean in so far as one was able to tell.

A SPECIAL LICENSE FOR THE PRACTICE OF SURGERY*

By John Darrington,
B.S., M.D., F.A.C.S.,
Yazoo City, Miss.

The medical profession has always sought the truth and it is the solid foundation of honesty of purpose, good service, unselfishness and truth that has enabled us in one generation to build such a wonderful structure.

It is the ambition of the profession to render constantly better service, and it is only necessary to compare our methods of today with those of a generation ago to realize how rapidly we have advanced. But as our goal is the ideal we must redouble our efforts, and we must have better trained and more skilled men. When we consider the opportunities that are available to the student today in the high-grade medical college, the post-graduate schools, the interneships in numerous hospitals, and as assistant in many instances to master surgeons, we feel that there is no excuse for the man who fails to avail himself of the chance to learn surgery. It is within the memory of this generation that becoming a doctor was a very simple process. The young man "read" medicine in the office of the old practitioner and came forth a "doctor," or he attended a two-year course in a poorly equipped medical school, and while trying to kill time he occasionally dropped in to hear a lecture. At the end of his second session he received his diploma and another "doctor" was inflicted upon the public.

The medical profession, whose motto is "service," appreciating the urgent need of better training, was able through the Council of Medical Education of the American Medical Association to raise the standard of the medical colleges. Today the A-grade schools are so well equipped that the student has a much better opportunity. These schools, by their entrance requirements, admit only boys who have a good academic education, which is not only important but absolutely essential in the study of this difficult profession. The modern medical colleges should now be able to graduate men competent in general medicine and no doubt they do so. In our desire for the safety of the public we have gone a step further by organizing a board of examiners in the various states, and each graduate who may desire to practice in that state must appear before his state board before he is granted a license.

These various steps, each being an improvement, indicated the desire of the medical profession to eliminate the incompetent and to improve the service.

I give the entire credit to the profession, because, so far as I know, the doctors have taken the initiative in every movement, legislative or otherwise, that tended to raise the standard of the medical profession.

Still further to increase the value of our service to the sick, a great medical organization is now engaged in hospital standardization, and we feel that it will accomplish much good. To get the maximum benefit from this campaign two things must be considered. One is the quality of the service the patient receives from the managing and nursing force of the hospital, and the other is the quality of the service he receives in the operating department. This brings me to the central idea that I am presenting in this paper: that only competent surgeons should be allowed to operate. That may sound simple, but it is one of the most difficult and complicated problems that we have yet to solve. I believe that the best surgical work in the world is being done in America, and I am equally confident that, to our discredit, some of the most reprehensible and unpardonable assaults are being committed upon confiding patients under the disguise of surgery.

Is this statement true or false? You men are surgeons. You are in daily touch

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with surgical cases. You know what kind of surgery is being done in your community and, therefore, I need not state that some restrictions are urgently needed.

Why is so much poor surgery being done? Surgical work is the most fascinating, attractive and remunerative department of medicine and men are engaging in this work who have not prepared themselves for it.

You would think that the general public would recognize and discourage incompetent operators and demand more skilled and experienced surgeons, but they do not seem to give to medical matters the careful thought or use the good judgment that they exercise in the business world.

Educating the public would be an important factor in the solution of this problem. Our success in suppressing the fee-splitting evil and the results in our cancer campaign would lead us to believe that efforts along the educational lines would prove of benefit. Along the legislative line our greatest hope of a satisfactory solution would be to require that for those who propose to engage in surgical practice. A minimum requirement should be fixed, and they should stand a special examination for a surgical license. I am confining my discussion to the surgical department, but I feel that the same rule should apply to every distinct specialty in medicine. A committee on graduate medical education has already done good work along this line, and later we may have some definite plans offered from this source.

The diagnosis of this trouble is easy, but the proper treatment, whether it be legislative, educational or persuasive, will certainly prove difficult. For that reason I was anxious to submit the case to you, remembering the old adage that in "multitude of council there is wisdom."

DISCUSSION

Dr. J. W. Barksdale, Winona, Miss.—In handling a problem such as this I think we should exercise a certain amount of care and discretion. It could, perhaps, be justly urged against us by those who come along in this or other generations that we came along the same route that the Doctor is now condemning.

The medical and the surgical sides of the profession have both done much along this line in the last few years. Most of this has come through the American College of Surgeons, which has set a certain standard for surgical work. It should be the aim and goal of every young man doing surgical work to be recognized, by this one body at least, as being capable of doing surgical work. I do not believe we will accomplish much along the line of legislation. They look upon us rather as a closed corporation and think we are trying to limit the men who wish to engage in our work. I believe we should educate the people to the fact that it takes a surgeon to do surgical work, and that work along the line of persuasion offers more than legislation could.

Another feature is that every practitioner of medicine is called upon to do certain minor surgery, and it is difficult to say "You shall do this," or "You may do this, but you cannot overstep the mark." It is difficult to fix the dividing line. If the ideas in the Doctor's paper could be carried out we should make many steps in advance.

Dr. Darrington (closing).—I see a gentleman here who told me a few years ago that a certain doctor had tried to remove a fibroid, but was unable to do so. When this doctor was called in to see the patient, the suppurating fibroid mass was protruding from the abdomen. If such things happened in the open he would be tried for assault. Men are getting into surgery who are not prepared for it. Men have a dream in which they think they are surgeons and they locate and begin to operate. You might as well call upon me to remove a lens from an eye. I would put the eye out. We have to be prepared for surgical work. It was for the reason that we should all try to raise the standard that I presented this paper.

EYE, EAR, NOSE AND THROAT

PARANASAL SINUS DISEASE IN INFANTS AND YOUNG CHILDREN*

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College of Medicine, University of Iowa,
Iowa City, Iowa.

I am glad to have the opportunity to describe a condition which is common in those parts of the north temperate zone which have a cold, moist, changeable climate. You, in the South, have little paranasal sinus disease affecting infants and young children, and my little patients with this trouble whom I am unable to cure by any kind of protracted treatment at home get wonderful results by going South. The prognosis in this class of cases is influenced more by the patient's financial ability to seek a proper climate than by anything else. Our hot dry summers have a most beneficial effect upon these patients.

Paranasal sinus disease flourishes in the North. Not only is it common there, but in my service a very large percentage of the chronic cases cannot be cured without leaving their native surroundings. The Yankee nasal twang is the result of paranasal sinus disease.

The diagnosis of paranasal sinus disease in infants and young children is difficult. We must know first what, if any, paranasal sinuses are of clinical significance on an anatomical basis. The x-ray examination determines this and at the same time gives some information regarding the pathology of the sinus.

At birth, ethmoidal sinuses are always developed. The maxillary sinuses are almost always present. The frontal sinuses usually appear at about the age of four.

J. Parsons Schaeffer in a personal communication informed the writer that the sphenoidal sinus at birth might be as large as 5 x 3 x 2 mm.

The more one investigates the size of the paranasal sinuses in infants and young children, the more one is impressed by the fact that precocious development may give to any or all sinuses clinical significance on an anatomical basis earlier in life than we expect.

The outlines of the sinuses in the x-ray plate are not so distinct as in the adult because their walls are composed of soft cancellous bone. They are not hard and ivory-like as in the adult. A blurred sinus does not definitely indicate sinus disease. A clear picture is a valuable negative finding.

Having found what sinuses are present and their size, the diagnosis of paranasal sinus disease is still a very difficult procedure. Infants and young children swallow post-nasal discharges and the symptoms of hawking and spitting characteristic of paranasal sinus disease in the adult are absent. Suppurative discharge may not be seen by anterior rhinoscopy.

An inflamed pharyngeal wall in the absence of diseased tonsils and adenoids is very suggestive of paranasal sinus disease.

Irrigation of the nose gives valuable information regarding the presence of nasal discharge.

Plate 1 shows a proper position for irrigation of the nose. The head being held over the edge of the table prevents the fluid from entering and infecting the eustachian tube. This is the position used in irrigating the noses of infants for therapeutic purposes. The finding of mucopurulent discharge in the nose by this procedure does not make a diagnosis of paranasal sinus disease. The absence of discharge is a very valuable negative finding.

The naso-pharyngoscope gives very valuable information even in infants.

These little patients make quite a noise during this examination. I do not believe, however, that they are hurt, because they become quiet as soon as the examination is completed. We hospitalize them for study because we find that only by con-

*Read in the Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., November 14-17, 1921.

stant observation for several days are we able to make the best diagnosis.

If it is necessary to give an anesthetic for the removal of tonsils, adenoids or for other purposes, examination with the naso-pharyngoscope can be made while the patient is asleep.

Maxillary sinusitis is best diagnosed by endo-nasal puncture, aspiration and culturing. The technic of the examination is as follows:

The procedure can be safely performed only by having before the operator an x-ray antero-posterior view of the paranasal sinuses. This plate will show the relation of the floor of the maxillary sinus to the attachment of the inferior turbinate. It also indicates the position and size of the antrum. With the plate before us there is no excuse for penetrating the orbit through the sinus or entering the cheek below the sinus. Neither should the outer nor superior walls of the sinus be scratched with the trochar. This procedure has been performed on infants and very young children in the author's clinic several hundred times, some of the cases being less than one year of age. It must be remembered that the unerupted teeth in this class of patients are in the floor of the antrum, not the antro-meatal wall. If the floor of the antrum is on a level with, or is below the attachment of, the inferior turbinate, the puncture is made through the base of the turbinate from the inferior meatus, and the needle passes upward and outward. If the floor of the antrum is above the attachment of the inferior turbinate, then the puncture is made through the middle meatus. The puncture is made with a sterile trochar. With the trochar in the maxillary sinus, a long, very slender, blunt needle to which is attached a sterile Luer syringe is inserted into the sinus through the trochar. The needle attached to the Luer syringe does not come in contact with the nose or antro-meatal wall or any other non-sterile part. The syringe contains 3 c. c. of sterile normal salt solution. This solution is forced into and withdrawn from the antrum several times, to loosen any pus which may be present in the sinus. The solution is then aspirated into the barrel of the glass syringe and the needle removed from the trochar. The presence of macroscopic pus or mucus in the fluid is noted and the fluid sent to the laboratory for microscopic and bacteriological examination.

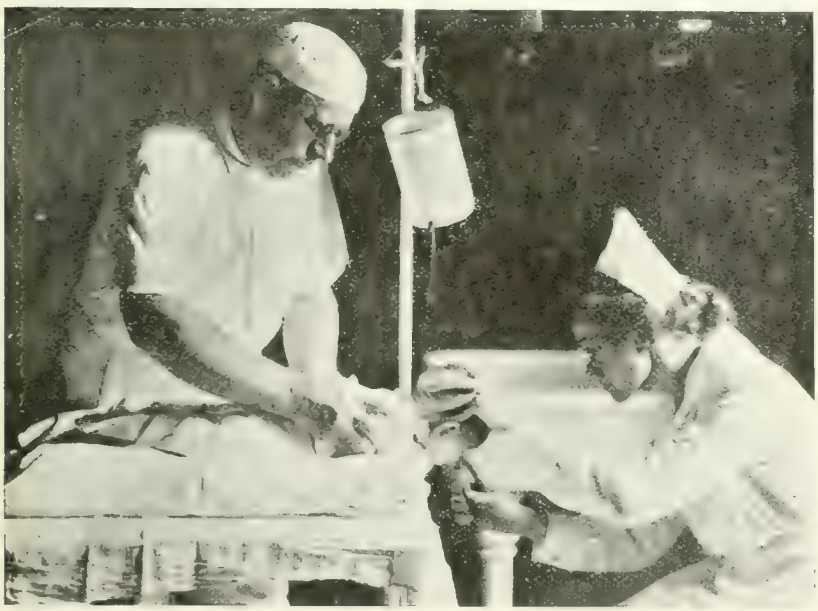

Fig. 1.—Shows proper position for irrigation of nose.

Plate 2 shows the canula of the syringe inserted into the maxillary sinus through the trochar. Note that there is no chance for contamination of the canula or syringe. The canula, entering the sinus through the trochar, does not come in contact with the external or the internal nose.

While the sphenoid may be aspirated and its contents cultured, the canula is contaminated as it passes through the nose.

Plate 3 shows the method of inserting a German silver canula into the sphenoid

and the aspiration of its contents into a Luer syringe.

The prognosis in paranasal sinus disease in infants and young children is good. A few cases, especially those with systemic complications, do not become permanently healed in our climate.

Eighty per cent of our chronic cases have been cured by the removal of diseased tonsils and adenoids without other treatment. The 20 per cent not cured by this procedure are the cases that are difficult to handle. The best results can be secured by sending the patients to a warm, dry climate. Nutritional therapy is important. Vaccine therapy, as suggested by Skillern, is valuable. Nasal irrigations are used for cleansing treatment.

Haskins' method of treating paranasal sinus disease in infants is a very valuable one. Suction is applied in the nose by means of a rubber catheter. The end of the catheter is applied near the ostia of the sinuses. That is by far the best method for cases with posterior cleft.

The treatment that we use most is spraying of the nose with dichloramin-T, 2 per cent in chlorosane, after irrigation, and drying the nose. This treatment was suggested to us by Emil Mayer. It gives the best results if used after douching the nose and cleansing it by the use of Haskins' or other methods. When the upper posterior sinuses are diseased, the use of 0.3 per cent phenol in petrolatum as suggested by Sluder is very efficacious.

Occasionally it is advisable to make a small opening in the anterior part of the antro-meatal wall of the maxillary sinus in order to get dependent drainage.

More extensive operative procedures should never be used in the treatment of paranasal sinus disease unless some serious systemic complication makes the procedure necessary, and then operation should be resorted to only after all other procedures have failed.

The complications of paranasal sinus disease in infants and young children are numerous and important.

A. M., age seven years, suffered from asthma. In this case Dr. Byfield, the pediatrist, could find no organic trouble or sensitiveness to the food proteins, etc. The tonsils and adenoids had been removed some time previously. Treatment of her diseased maxillary sinuses was followed by a disappearance of her asthma.

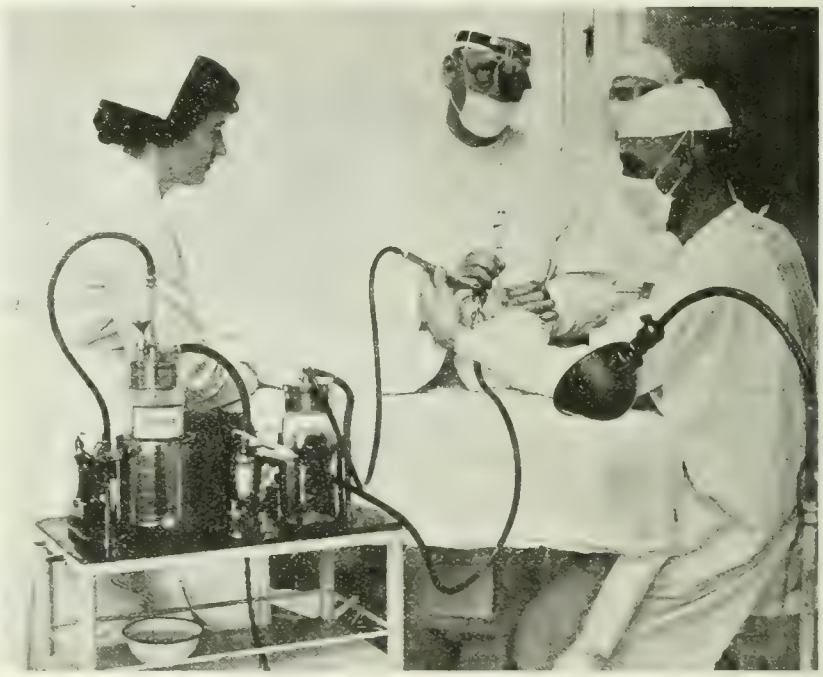

Fig. 2. Canula of the syringe inserted into maxillary sinus through the trochar.

N. N., seven years old, suffered from very extensive acute cervical adenitis, with a temperature of 105°. His tonsils and adenoids had been removed one year previously. The boy was very ill. Treatment of his diseased maxillary sinuses alone resulted in a disappearance of his trouble in one week's time. I have seen an infant one year of age with the same condition, the result of ethmoiditis, relieved by treatment of the ethmoiditis.

F. M., six years of age, had recurring fever and severe attacks of periodic vomiting, which were complicated with extremely severe acidosis.

Examination revealed purulent ethmoiditis, remnants of faucial tonsils, remnants of adenoids, and an infected lingual tonsil.

The tonsil stumps and adenoids were removed and the lingual tonsil cauterized. This was followed by treatment of the ethmoiditis.

At the end of four months the patient was returned for examination. He had had no attacks of vomiting and no recurrence of fever. The nose was perfectly clear.

Very recently a pediatrist sent me a case with the history of repeated attacks of fever without cause. The tonsils and adenoids had been removed two years previously, but the patient still suffered from repeated colds. Chronic suppurative ethmoiditis and maxillary sinusitis were found. Eradication of this will, in my judgment, relieve the trouble unless there should be infection somewhere in the body that has been overlooked.

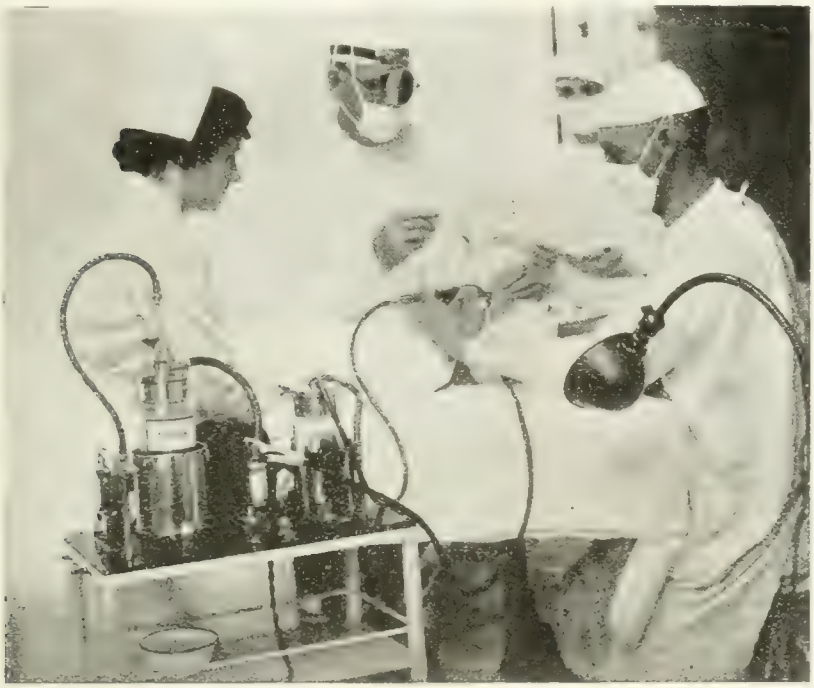

Fig. 3. Method of inserting German silver capula into sphenoid and the aspiration of its contents into Luer syringe.

Bronchitis, laryngitis and pharyngitis are frequently the result of paranasal sinus disease.

Acute osteomyelitis of bone surrounding the diseased sinus is a frequent complication. It may result in swelling of the neighboring soft parts. Abscesses may form in the orbit or on the cheek, which point and sometimes discharge pieces of bone.

We now have in the hospital a six-month-old baby with posterior cleft and pansinusitis. It has an abscess in the cheek and lower part of the orbit which is secondary to osteomyelitis of the superior maxilla due to the sinus disease.

A number of eye complications may be incident to involvement of these sinuses: phlyctenular conjunctivitis, ulcer of the cornea, uveitis, optic neuritis, chorioretinitis, panophthalmitis and orbital abscess.

Cavernous sinus phlebitis, meningitis, and, in young children but not infants, brain abscess may result.

Paranasal sinus disease may not be the cause of infectious arthritis, but it is certain that in certain cases the acute joint trouble cannot be eradicated without curing the paranasal sinus disease.

Baby E. T. was an interesting case. On December 14, 1918, at the age of three, she was referred to us by Dr. Steindler, the orthopedic surgeon, for examination for a focus of infection in the upper respiratory tract. His diagnosis was chronic multiple infectious arthritis. We found chronic tonsillitis, adenoids and bilateral maxillary sinusitis. A hemolytic streptococcus was secured both from the maxillary sinuses and from the tonsils which, when injected into a rabbit, caused arthritis. The tonsils and adenoids were removed and the diseased maxillary sinuses treated by simple irrigation with argyrol. The sinus disease apparently disappeared but, while the arthritis was improved, it persisted. Six months later an opening was made in each maxillary sinus through the antro-meatal wall and the sinuses were treated. The sinus disease disappeared-and with it the acute joint trouble. Two years after this, on July 6 last, the mother of the little girl brought her into the Pediatric Service. The mother stated that since the child left the hospital two years previously she had been much

improved. The first year she had apparently perfect health, but the preceding winter following a severe cold she had considerable nasal discharge. There was no trouble with arthritis at that time, but two weeks previously she developed a stiff and swollen left ankle. An examination revealed pus in each maxillary sinus. A small opening was made in the antro-meatal wall and the maxillary sinuses were irrigated. Vaccines were used with an apparent disappearance of the maxillary sinus disease and of the acute manifestations of the arthritis. Very recently I saw this child again. She was perfectly well. She could dance and play as well as any child.

This case illustrates two things: first, that paranasal sinus disease may cause systemic infection at the age of three; and second, that paranasal sinus disease in infants and young children is sometimes not easy to cure permanently.

R. A., aged four, suffered from infectious arthritis involving the joints of her fingers and toes. The joints were much swollen and painful. She could not walk. There was at the time no permanent deformity. When I saw her first she had bad tonsils and adenoids, and maxillary sinusitis. The tonsils and adenoids were removed. Three months later she was much improved, but still suffered with acute attacks of arthritis with pain and fever. The nasal sinuses were treated for one month. At the end of that time a streptococcus viridans persisted in each maxillary sinus and the arthritis remained active.

Then a small antro-meatal opening was made and the sinuses were treated. This was followed by relief of the arthritis. Sixteen months after she left our service a report stated that she had been, and was, perfectly well.

W. F. was a case of recurrence of multiple infectious arthritis which recently returned to our service from Dr. Byfield, Professor of Pediatrics, with the following note:

"My dear Dr. Dean: One of the boys in the arthritis deformans series has been absolutely free from trouble since the operation which took place about two years ago, I believe. Just a few weeks ago he suddenly had a recurrence. The symptoms were pain in the joints with some swelling and stiffness, also some headache and an interesting change in disposition, such as I would suspect would take place in sinus infection. I recall in this case that it was rather difficult to spot the infected area, but it was finally located, and the relief to the boy was the result. This boy has been unusually well since the operation, has had an excellent appetite and has done well in school. In a few weeks since the beginning of the recurrence he has lost weight and the appetite has been poor. The mother seems to feel that the treatment which you gave him was the thing which was responsible for his relatively long period of freedom from trouble, and she is willing to have you go ahead again and to have no orthopedic treatment until the focal infection has been studied."

(Signed) "ALBERT H. BYFIELD."

W. F. is now fourteen years of age. He came into our service at the age of eleven. His tonsils and adenoids were removed July 26, 1918. On September 25, 1918, because of the continuance of his acute joint infection, a second examination of his nose was made. A deflected septum with suppurative ethmoiditis was found. Examination of the maxillary sinuses was negative. A submucous operation was performed upon the septum and treatment instituted. At the end of two months' treatment a hemolytic streptococcus persisted in the posterior ethmoids and sphenoid of each side. These sinuses were very necrotic and on November 7 they were exenterated. With the apparent disappearance of the sinus trouble the acute arthritis disappeared and returned only after a period of two years. Up to two weeks before the admission on June 29, 1921, he had been free from trouble. At the time his knee and ankle joints became painful and swollen. Preceding this trouble he had had, as he said, a cold, and a nasal discharge persisted.

With the nasopharyngoscope pus was found in each posterior ethmoidal and sphenoidal region. The left sphenoid was particularly badly diseased. The upper posterior sinuses were again operated upon and post-operative treatment was instituted. As a result, the nasal discharge is rapidly disappearing and the joints are becoming rapidly better. This case illustrates nicely the fact that when the removal of tonsils and adenoids in a child does not remove the focus of infection, the paranasal sinuses should be carefully examined. It also brings to my mind again, forcibly, the fact that in some cases a cure of paranasal sinus disease in children is very difficult.

D. M., now nine years of age, is one of our most instructive cases. She had multiple infectious arthritis from the age of two and one-half years. When she was four years of age I removed her tonsils and adenoids with much improvement. That was in 1916, when we were not examining our four-year-old children for paranasal sinus disease. This little friend of ours would be today much better off if in 1916 we had examined, diagnosed and treated the paranasal sinus disease which was undoubtedly present. When seven years of age we diagnosed a bilateral sphenoiditis and posterior ethmoiditis. The diseased condition was eradicated. The treatment was followed by the most striking improvement in the arthritis, temperature, and general condition of the case. She was discharged in December, 1919.

In July, 1921, she returned with a recurrence of the acute arthritis. The sphenoidal and ethmoidal regions, much to my surprise, were perfectly healed and clean. A careful examination showed pus in the left maxillary sinus. This sinus was drained and in three weeks we had a noticeably changed child. From a morose, disconsolate one suffering from acute pain, she was changed into a happy child, free from pain. Her general appearance was wonderfully improved.

For six weeks before this little patient came into our service she received the most careful metabolic treatment and vaccines in the Pediatric Service without improvement. The only thing that gave her relief when she was six, and when she was nine, was the treatment of her paranasal sinuses.

Discussion follows paper of Dr. Murphy, page 854.

INFECTION OF THE NASAL ACCESSORY SINUSES WITH SERIOUS MENINGEAL COMPLICATIONS*

By J. W. Murphy, M.D.,
Cincinnati, Ohio.

I shall confine myself largely to my own clinical experience with this class of cases, and by means of the lantern show from original sections the intimate relation of these various cavities.

SYMPTOMS

The symptoms of disease of one or more of the accessory cavities is such that some authorities think they can diagnose the special cavity from the character and location of the pain, and not a few have diagrammed special painful areas indicative of the cavity in which the disease will be found. Pain in the top of the head, or in the occipit, is supposed to have its origin in the ethmoid or sphenoid cells, while pain over the eye, or the frontal region, is referable to the antrum or frontal cavities (Ewing's sign). These symptoms are valuable only when taken in connection with the history of the case. When meningeal symptoms are present, the case presents a serious aspect, and a speedy and accurate diagnosis is of the utmost importance.

The neurologists think the rhinologist is prone to refer all meningeal symptoms to some disease of the accessory cavities and fails to recognize the fact that meningeal symptoms may be caused by tumors or growths entirely outside the nasal cavity, but situated within the brain itself. I heard no less an authority on brain diseases than Harvey Cushing make the rather startling statement that brain tumors were relatively as common as abdominal tumors. He thinks the rhinologist is too prone to refer meningeal symptoms to some disease in the attic of the nose.

Again some of the worst and most marked cases of disease in the accessory sinuses have little or no pain at any time, in face of the fact that pus can be seen pouring from one or more of the accessory cavities. In such cases the diagnosis is a simple matter, but when there is little or no discharge and not much pain, the diagnosis of a diseased cavity may become exceedingly difficult.

DIAGNOSIS

In the diagnosis of these cases, I always make free use of such aid as the x-ray and transillumination can give, but they are of use only when taken in conection with the clinical symptoms. I have never felt that I could place much faith in transillumination, or the x-ray picture of the ethmoid and sphenoid cells, as their situation and the variation in the density of the overlying bone render the interpretation of the picture quite difficult, even in the hands of the expert roentgenologist.

That acute and chronic infection of the accessory cavities is more frequent than we formerly thought is abundantly proven by hospital and post-mortem room statistics, and during an attack of any one of the acute infectious diseases of the respiratory tract, it is seldom that one or more of the accessory sinuses is not involved.

Herein lies one of the chief dangers, as a neglected acute case may become chronic. Where to draw the line between an acute and a chronic case is often difficult. As a general rule, I consider any case of suppuration that has existed for six weeks or more as having passed into the chronic stage. Then more radical treatment is indicated.

Every suppurating sinus is a menace to the life of the patient, as the following case will illustrate:

Case I.—Mr. A., aged 22, consulted me in 1918 for a severe pain over the left frontal region following an attack of acute coryza. He gave a history of a chronic discharge from the nose. He had been advised to have it operated upon, but delayed, as the only trouble experienced was the nasal discharge. Since the recent cold he had contracted, the pain had been so severe that he had to resort to opiates for relief. An examination showed complete blocking of the attic of the nose on the left side, which was quite narrow. Pus was trickling down between the septum and the swollen middle turbinate. There was marked tenderness of the upper inner angle of the orbit, at the point of attachment of the pulley of the superior oblique, and internal and posterior to it, known as Ewing's sign. I consider this a most valuable diagnostic point in frontal inflammations.

The patient had been running a slight fever, but attributed it to the cold he had recently contracted. I did not attempt to probe or wash out

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

the frontal sinus, as when the swollen middle turbinate was shrunken by the application of a weak solution of adrenalin and cocain, and the nose douched with hot saline solution, complete relief was afforded. An application of a 2 per cent solution of silver nitrate, followed by an oily spray, was the only treatment given. On the fifth day he suddenly developed an orbital cellulitis in the left eye, with marked symptoms of a retro-bulbar abscess. Marked meningeal symptoms rapidly developed. The patient was sent to the hospital and the left frontal sinus was opened externally and a large retro-bulbar abscess evacuated. The frontal sinus was full of pus, granulation tissue and several hard, firm polypi, proof that the diseased condition was not of recent

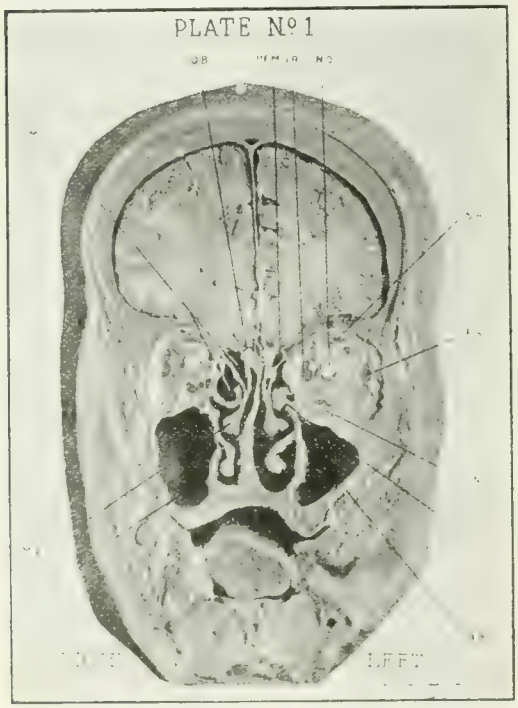

Plate No. 1.—Frozen injected coronal section, showing the relation of the posterior ethmoid cells to the orbital and cranial cavities. I. T., inferior turbinate. M. T., middle turbinate. E. M., ethmoid cells. O. B., olfactory bulb. P. E. M., posterior ethmoid cell extending over the sphenoid sinus. I. R., internal rectus muscle. N. O., optic nerve. S. R., superior rectus muscle. E. R., external rectus muscle. H., hiatus semilunaris. A. M., antrum maxillaris. I. N. R., inferior rectus muscle.

origin. A sinus opening through the inner wall of the frontal was the cause of the orbital abscess. The meningeal symptoms increased and the patient succumbed two days later to an acute meningitis. I think the point of infection was along the course of the optic nerve, as the meningeal complications developed so soon after the orbital cellulitis and abscess were formed.

That quite extensive nasal disease can be present with little or no pain complained of, has been the experience of all men doing nose and throat work. It is wonderful how Nature will wall off and protect the dura from infection in cases of this kind.

Case II.—Mr. L., aged 32 years, consulted me in 1919 in reference to loss of vision in the right eye. He said he had been well until three months previously, when, after a severe cold in the head, he had noticed a foul-smelling discharge from the right nostril, which was followed by a gradual loss of vision in the right eye.

Examination showed complete loss of vision in the right eye from atrophy of the optic nerve. The left eye was normal.

The right nostril was full of foul-smelling pus and the body of the ethmoid was necrotic and so

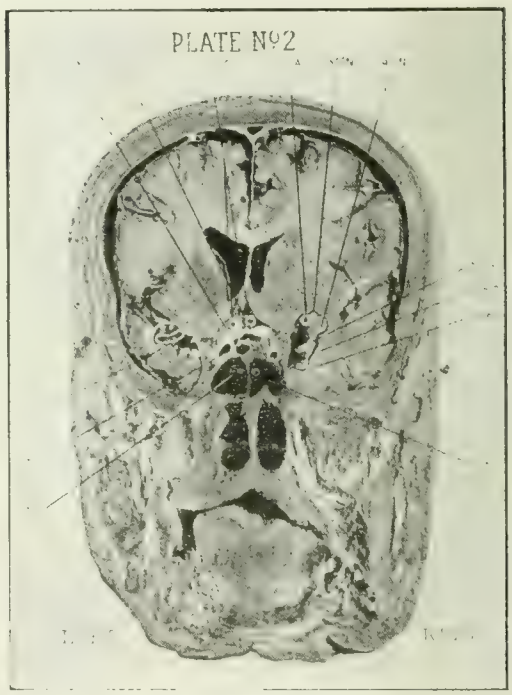

Plate No. 2.—Injected frozen coronal section through the optic chiasm and the cavernous sinus, showing the relation of its contained vessels and nerves. S. S., sinus sphenoidalis, right and left, showing ostium sphenoidalis. P. E. M., posterior ethmoid cell extending back over sinus. O. C., optic chiasm. C. A., carotid artery in bony canal. I. C. A., internal carotid artery in cavernous sinus. 3rd N., third nerve. 4th N., fourth nerve. 6th N., sixth nerve. 5th O., ophthalmic division of fifth nerve. 5th M., sup. maxillary division of the fifth nerve.

loosened that there was a temptation to grasp the bone with the forceps and remove it at once. However, its close proximity to the cavernous sinus caused me to hesitate. Under a general anesthetic the antrum, ethmoid, and sphenoid were opened. All were found in an advanced stage of necrosis, which had surely existed longer than three months, when the patient dated the start of his trouble. This patient died three weeks later from septic meningitis. The post-mortem

showed the entire attic of the nose gone and the overlying dura much thickened from Nature's attempt to ward off the infection.

We all meet with cases of accessory sinus disease of long standing, in which a gradual exposure of the dura causes no meningeal symptoms, as the following case will illustrate:

Case III.—Mr. B. consulted me for a growth in the frontal sinus, with complete loss of vision. It was the most extensive sarcoma of the frontal sinus that I have ever seen. The growth had pushed the forehead forward and downward, so that the loss of vision was mechanical from pressure on the eyelids. The growth had been very rapid, but, strange to say, not painful. Dr. Joseph Ransohoff and Dr. Iglauer saw the case in consultation. In order to remove the mechanical pressure from the eyes an incision was made with the cautery knife, back of the hair line, the entire width of the forehead, and as much as possible of the growth was removed.

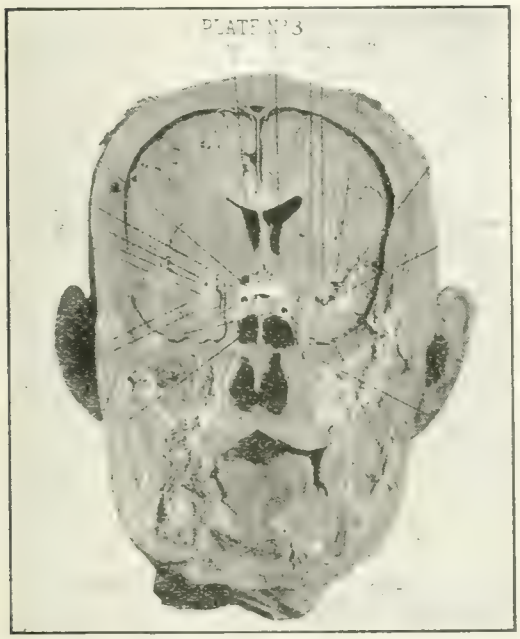

Plate No. 3. Injected frozen coronal section through the cavernous sinus just back of the optic chiasm, showing the relation of the sinus to the sphenoidal cells and the position of the arteries and nerves in the cavernous sinus. C. A. V., cavernous sinus. C. A., carotid artery, internal. 3rd N., third nerve. 4th N., fourth nerve. 6th N., sixth nerve. O.5th N., ophthalmic division of fifth nerve. L. S., left sphenoid. R. S., right sphenoid. I. C. A., internal carotid artery in bony canal of sphenoid. M. 5th, sup. maxillary division of fifth nerve. O. C., optic chiasm. A. C., anterior cerebral artery, right and left. O. A., ophthalmic artery.

The bony front wall of the sinus was fully one inch forward from its original position.

Here again the posterior wall of the sinus was gone and the growth was in direct contact with the thickened dura, yet no meningeal symptoms were present at any time.

While no operation could cure a case of this character, yet we felt that some relief might be afforded from the pressure of the growth and the restoration of the vision. The patient made an uninterrupted recovery from the operation and was able to go about unattended, as his vision was restored. He expressed himself as much more comfortable. Of course there was a return of the growth, and the patient died a year later.

Here is one more case which illustrates the deceptive symptoms of sinus disease:

Mr. H., aged 43, consulted me in October, 1919, for pain in the top of the head and a general feeling of depression. Examination showed a badly deflected septum on the right side, completely blocking the attic on that side. The left side was normal. Transillumination and x-ray examinations were reported negative. No discharge from the accessory sinuses was present and the case was referred to his family physician for treatment. The man had large business interests and had been carrying a peak load for some time. No clinical symptoms were present upon which to base a disease of the accessory sinuses.

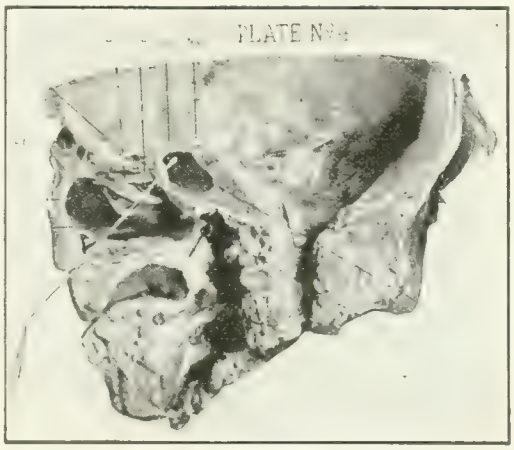

Plate No. 4.—Sagittal section, showing the relation of the sphenoid to the optic nerve. Turbinated bodies atrophied. S. S., sinus sphenoidalis 30 mm. long, 25 mm. broad, and 20 mm. deep. E., bougie in eustachian tube. N. O., nervus opticus. O. S., ostium sphenoidalis. O. M., ostium maxillaris. M. T., middle turbinate atrophied. A. E., anterior ethmoid cell. E. B., ethmoid bulla. I. T., atrophied inferior turbinate. P., probe passing through ostium sphenoidalis.

Two months later, on Christmas day, while enjoying the family dinner, he suddenly fell from his seat and became unconscious, with all the symptoms of a paralytic stroke. The family physician was called, but could find no paralysis. There were marked meningeal symptoms that could not be accounted for by any physical examination. I was called in consultation on the third day.

I found the patient in a semi-conscious condition, with marked meningeal symptoms, and pu-

pils widely dilated. An ophthalmoscopic examination was negative. The right nostril was full of pus and transillumination showed that it was much darker on the right side. A diagnosis of septic sinusitis was made and an operation advised. The patient's condition was so critical that he could not be removed to the hospital, or even from his bed.

The following day, under a light cocain anesthesia, the antrum was washed out and found to contain pus. The ethmoid was exenterated and found to be full of pus, under much pressure, and the bone was necrotic. The anterior wall of the sphenoid was also removed. Following the operation, the meningeal symptoms were exaggerated and the temperature went up to 105°, proving, I think, that the meningeal irritation was being caused by the absorption of pus, most likely

Plate No. 5.—Sagittal section, showing the relation of the sphenoid with the optic nerve and the ethmoids with the frontal sinus. S. S., sinus sphenoidalis. E. T., bougie in eustachian canal. S. T., sella turcica. N. O., nervus opticus. O. S., ostium sphenoidalis. P. E., posterior ethmoid cells. M. T., middle turbinate. A. E., anterior ethmoid cell. S. F., sinus frontalis. I. F., infundibulum with probe passing from the frontal sinus. I. T., inferior turbinate.

from the confined pus in the ethmoid. Had it been from the sphenoid, we should have had more marked eye symptoms. In twenty-four hours the fever began to subside, the meningeal symptoms improved, and the patient made an uninterrupted recovery.

This patient had some accessory sinus disease when he consulted us in October, but the clinical symptoms did not justify a diagnosis at that time. Owing to the marked deflection of the septum to the right side, when pus did form in the ethmoid, it could not be discharged, but was confined under pressure, and was finding its way either by the lymph channels or the blood stream to the dura. The meningeal irritation was being caused by the effort of Nature to wall off the infection. I had occasion to examine the patient recently at the request of a life insurance company and found him entirely well, with no evidence of any sinus involvement. I reported to the insurance company that I considered the risk a safe one and the policy was issued.

The insurance companies have recognized for a long time that an applicant for insurance, with the history of a chronic discharging ear, or a suppurating sinusitis, is not a good risk.

DISCUSSION

Papers of Dr. Dean and Dr. Murphy.

Dr. T. W. Moore, Huntington, W. Va.—About a year ago a patient came to me on account of a disseminated choroiditis that had rendered him blind in one eye. The Wassermann was negative. He had a large edematous middle turbinate which completely blocked one nostril. The x-ray confirmed the diagnosis of ethmoiditis. Removal of the middle turbinate was followed by a free flow of pus. No other operative work was done, and the patient was put to bed. The next morning when I reached the hospital I found him up and dressed, feeling well and anxious to leave for his home over one hundred miles away. To this I demurred, but was finally forced to consent to it. What the patient did until his train left five hours later I do not know. That night at 8 o'clock his family physician was called and found him in convulsions, which grew worse until he became comatose and died the following night. It was impossible to get a post-mortem examination.

About four years ago a patient who had suffered with frontal sinusitis for years was being treated by a confrere who decided that an external operation must be done. For some reason the patient was brought to me for operation. After consultation we decided upon an intranasal operation. Within forty-eight hours there developed a headache and a slight elevation of temperature; in other words, a beginning meningitis, which gradually grew worse until coma and death followed on the sixth day after operation. He had been having almost unbearable headaches for several months. A post-mortem examination was not permitted.

When these cases present themselves they demand surgical interference, but we should realize and instruct them as to the possible seriousness and the great responsibility that is being assumed. We open sinuses and treat them, and the majority recover. We forget how great the risk may be until we meet with a fatality as did Dr. Murphy, or, more strikingly, as in my cases, in which we had no reason to suspect a serious outcome.

Dr. J. A. Stucky, Lexington, Ky.—There never was a time in the history of oto-rhinology when more was expected of the rhinologist than today. The day of spraying, burning and scraping has passed. The medical profession is putting it up to the rhinologist to say why, and where, and how nose conditions exist. When Dr. Dean referred to the climate and the sniffling noses of the children in Iowa, I wondered whether it was the climate or the nature of food the children were given.

I am more and more convinced that the food problem has a great deal to do with the nose problem in children, and the more closely I watch my Orphans' Home work in Kentucky and study the children and regulate their feeding, the more I am convinced that one of the greatest problems we have is the feeding problem. I have been astonished at the results from a well-balanced diet.

I am glad that Dr. Dean said little about local treatment. There is no part of the body that will do more for itself than the nasal attic if we ventilate it and drain it. There is no operation connected with our specialty that gives me more anxiety and thought than nasal operations. I have had fatal cases and presented them to the profession long before Dr. Murphy presented his. Some of you have received those reprints in the past. Unfortunately, the infection that extends up through the nose into the brain and causes death frequently attacks the silent area of the brain and gives us no focal symptoms. I have held a post-mortem examination where I could take a wooden toothpick and go through the cribriform plate, and yet that patient had been walking around her home twenty-four hours previously.

I believe this is the age when the scientists of rhinology must get themselves together and be reconstructed. A little yellow secretion in the nose does not indicate surgery.

There is nothing I dread more in children than an operation upon the nose. It takes a real diagnostician, a real surgeon, to go into the specific spot of infection in the region of the ethmoid and sphenoid and get rid of it and not open avenues for new infection. Sluder has given us the best local treatment for the average baby and adult with subacute inflammation and suppuration of nasal accessory sinuses. That is not a spray. He calls it a douche. It is a non-irritant, soothing alkaline solution and its use gives good results. It is 55 grains of chlorid of sodium, 55 grains of bicarbonate of sodium, 3 drams of sugar of milk, and one pint of water, used with a small glass nasal douche cup, two or three times a day.

Dr. Jno. H. Foster, Houston, Tex.—It is possibly true, as Dr. Dean has said, that in the South paranasal sinus trouble is less frequent than in the North, but we certainly have it. My attention was first called to it by persistence in discharge in children where adenoids and tonsils had been removed.

In cases of maxillary sinus infection I have found puncturing and irrigation with the instillation of a silver solution of value. Silver salts are particularly good in any streptococcic infection.

Dr. H. H. Briggs, Asheville, N. C.—In a dry climate, certainly in Asheville, very few of these cases require operative interference. Some, of course, do, the indications for operation depending in large measure upon the pathology present, which is often very difficult to diagnose. In cases where adenoids and tonsils have been successfully removed and the symptoms of sinus disease persist after weeks and even months of treatment, we are justified in draining the area. Drainage, as in most surgical conditions, is the essential treatment. We cannot always have these cases coming to our office for daily treatment.

I have been well pleased of late with a method of treatment for these cases, with an apparatus producing at the same time both irrigation and suction. It consists of a fountain syringe placed about one foot above the head and a tube leading into one nostril (the more closed one), conveying a solution composed of 1 or 2 per cent sodium chlorid and the same of sodium bicarbonate through the nostril and back through the other nostril, from which another tube extends to a basin on the floor. The flow is alternately induced and discontinued by compressing the inflow tube, and the weight of the column of water in the exit tube produces a suction, the amount of which depends upon the distance from the nose to the basin. The patients for whom I have prescribed this cleansing method are universally pleased with its action and I have found the results quite satisfactory. It is a useful auxiliary in all stages of sinus disease and frequently effects a cure. In the more serious cases where the mucous membrane of the sinus has become markedly involved, nothing short of surgical procedure can be depended upon.

Dr. Martin E. Tabor, Dallas, Tex.—I have been working upon the accessory sinuses a good many years, and I have a great deal of respect for the men who read these papers. But when I hear them speak of passing nitrate of silver up into the ethmoid region, and when I hear them say that the sphenoid is the most frequent cause of optic neuritis and atrophy, I want to stop them. We must be conservative. But do not lay it all upon the sphenoid, because it is the most protected sinus of the whole head.

Dr. Dean (closing).—Regarding operative work on the sinuses of infants and young children, with the exception of making an opening through the inferior meatus into the maxillary sinus for drainage, no ventilation operative procedure should be carried out unless serious systemic condition secondary to the sinus disease demands the operation.

In Iowa the acute and chronic infections of the paranasal sinuses in infants and young children are influenced very much by the weather. Up to date I have examined the paranasal sinuses of some 3000 infants and young children. In July and August, when we have dry, warm weather, manifestations of paranasal sinus dis-

ease are rare. The more damp and chilly the weather the larger the percentage of paranasal sinus infections in children coming to the hospital for the removal of adenoids.

I do not know that multiple infectious arthritis is ever directly caused by infection of the paranasal sinuses. I do know that in certain cases there is such an interdependence between the two that the infectious arthritis can be controlled only after the removal of the paranasal sinus disease.

Dr. Murphy (closing).—Since I have been following Dr. Dean and his very careful work I have been finding cases that I had overlooked before. I had been diagnosing them as simple coryza and had failed to go into the sinus question in children.

CONTROL OF EARACHE THROUGH THE NASAL (SPHENOPALATINE OR MECKEL'S) GANGLION*

By Greenfield Sluder, M.D.,
St. Louis, Mo.

During the past year I have discovered that the pain of inflammatory middle ear disease can be controlled by cocainization of the nasal ganglion. I have had two middle ear abscesses with pouting drums where this was true. It did not, however, prevent the pain of paracentesis.

I have also learned that the pain of inflamed eustachian tube cases can be controlled in this way. Some have had the land marks on the drum obliterated. In one case there was considerable vertigo and tinnitus, which ceased with the pain.

The earache which follows tonsillectomy is also controllable from the nasal ganglion by cocainization.

No anatomical facts known to us at present serve to explain these phenomena.

THE CONTROL OF MANDIBULAR PAIN THROUGH THE NASAL (SPHENOPALATINE OR MECKEL'S) GANGLION*

By Greenfield Sluder, M.D.,
St. Louis, Mo.

During the past year I have learned that the pain in the lower jaw produced by the difficult removal of teeth can be stopped by cocainization of the nasal ganglion. I have had four cases in which much trauma and infection followed the removal of teeth that also required the removal of the alveolus over a space one centimeter in diameter.

In these cases the pain and inflammation at the site were severe.

Whether the pain of common "toothache" in the lower jaw can be stopped in this way cannot be answered at present. I have not yet had the chance to try the experiment.

When one recalls the fact that the nasal ganglion is the sympathetic ganglion of the maxillary division of the trigeminus it is difficult or impossible to explain this phenomenon on the basis of known anatomy.

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

THE CONTROL OF GLOSSODYNIA THROUGH THE NASAL (SPHENOPALATINE OR MECKEL'S) GANGLION*

By L. W. Dean, M.D.,
Iowa City, Iowa.

A number of years ago a woman 58 years old came under my care complaining of glossodynia with the diagnosis of carcinoma of the base of the tongue. Three years before I saw her she had suffered a mild coryza accompanied by pain in the left side of the throat and tongue. In the course of some weeks this pain became localized and constant in the tongue. It was a neuralgic pain. Examination of the throat and tongue was negative. A sphenoid operation had been done for sphenoiditis. It did not, however, influence the glossodynia.

Six months ago I found that cocainization of the nasal ganglion stopped the pain in the tongue and I injected the ganglion with ninety-five per cent alcohol with five per cent phenol. This has given complete and apparently permanent relief.

At present our knowledge of anatomy gives no basis for this phenomenon.

*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

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DR. M. Y. DABNEY, Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Sixteenth Annual Meeting, Chattanooga, Tennessee, November 13-16, 1922

THE ANNUAL MEETING

In a previous editorial, reference has been made to the fact that November 13-16 Chattanooga would welcome the Southern Medical Association to the city of its birth, where it was brought into existence sixteen years ago, and which it has not visited since then. But what a contrast to the old days the present meeting presents! Sixteen years ago the Association had but few members, held only a general meeting for all branches of medicine, and presented but a small number of papers. Today, there are nearly 7,000 members and thirteen sections, plus five affiliated bodies, before which last year were read 193 papers. Then, six states were represented. Now, there are fifteen states and the District of Columbia.

Today, the Southern Medical Association enjoys an enviable reputation among the great medical organizations of the world, and its JOURNAL is sent to the remotest corners of the globe; for it is the mouthpiece of America's second largest medical body.

THIS YEAR'S PROGRAM

The programs of the various sections have been arranged with a view to presenting a well selected list of papers by members of the Association and in addition a few by certain men from elsewhere who are regarded as authorities in their respective fields. Thus, will the visitor to Chattanooga be assured of hearing the last word in medical progress.

A distinctive feature of all meetings of the Southern Medical Association is the fact that any one may enter freely into the discussion of any paper without previous arrangement.

SCIENTIFIC EXHIBITS

Unlimited space is available for scientific exhibits and it is hoped that they will be more numerous than at any previous meeting. For these the Association has three awards, viz.: one for the best exhibit by an individual physician; one for the best exhibit by state, county or local board of health; and one for the best medical school within our territory. More physicians and institutions in the South should prepare scientific exhibits for our meetings. Any physician or institution who cares to submit an exhibit at the Chattanooga meeting will please advise the Association office as soon as possible. However, even late exhibits can probably be accepted.

COMBINED VACATION AND STUDY

Many Southern physicians, wearied of busy practice through the long, hot summer, will welcome the opportunity to seek a high altitude at this conveniently located point and will combine recreation with the meeting. The termination of two large strikes, the resumption of industries and a good price for cotton, have given an impetus to business which in turn is reflected in the optimism of the medical profession.

AUTOMOBILE TOURS

Although the railroads in our territory have granted special rates, news comes that some of the physicians are taking advantage of the fall season and Chattanooga's central location to make the trip by automobile. Certainly in many instances this will prove both feasible and delightful. The automobile clubs of any cities will be glad to furnish routings and information about the roads. In addition, the advantage of having a car after one reaches Chattanooga is worthy of consideration. The whole country surrounding Chattanooga is so dotted with points of historic and scenic interest that the tourist will find innumerable inviting side trips.

RESERVATIONS

Chattanooga expects a large gathering and in that city enthusiasm runs high. It is a vacation country as well as an industrial community, whose hospitality is far-famed. Plan to attend what promises to be the Association's greatest annual gathering. Hotel reservations should be sought without delay by addressing Dr. J. H. Revington, Chairman of Hotel Committee, Volunteer Building, Chattanooga, Tenn.

ORIGIN OF THE STOMACH TUBE

In the active pursuit of our present day study of medicine much of interest in the history of this branch of science is often overlooked, forgotten or even facts recorded many years before, have again been brought forth as new, when with a thorough study of the literature errors of this character easily might have been avoided.

It is our desire here again to record the fact that one of our latest specialties, gastro-enterology, dates its origin as far back as the beginning of the Nineteenth Century, when the use of the stomach tube was first recorded. There has been much discussion as to the priority of its discovery, and the view has been generally accepted that this instrument is of English origin, and that the two English surgeons, Jukes and Bush, were its inventors. This claim is based upon an article published by Jukes in the *London Medical Repository* of 1822 under the title, "Description of an Apparatus for Removing Poison from the Stomach. Invented by Mr. Jukes, Surgeon." However, it is but a simple matter to demonstrate that the credit of this discovery is due to Dr. P. S. Physick, of Philadelphia, who published his original paper in October, 1812, in *The Eclectic Repository*, iii, 3, under the title of "Account of a New Mode of Extracting Poisonous Substances from the Stomach, by Philip S. Physick, M.D., Professor of Surgery in the University of Pennsylvania." This was ten years prior to the appearance of Jukes' article. He declares that he employed the tube in washing the stomachs of twins three months old who had accidentally been given an overdose of laudanum by their mother. He utilized a large catheter for that purpose. One of the children was saved; the other died. Physick states that the idea of washing out the stomach with a syringe and tube in cases in which quantities of laudanum or other poisons had been swallowed occurred to him at least twelve years before, and he had constantly for many years recommended it in his lectures.

In the year 1809 his nephew, Dr. Dorsey, practiced lavage in a case, but the patient had swallowed the poison twelve hours previously, so that the method was not successful in saving his life. The tube was soon forgotten, and was not generally employed until after 1869, when Kussmaul suggested its use in the treatment of gastric dilatation.

It is with great pride, therefore, that we may point to the stomach tube as an American invention and to the specialty of gastro-enterology as of American origin.

ANENT THE CHIROPRACTOR

The fact that something like twenty states are said to have established separate examining boards for chiropractors, and that agitation is rife among the rest to attain the same end, should arouse all who are interested in the science of medicine to a sense of the necessity of a thorough enlightenment of the public regarding the impending danger. Of great help in this connection is the article by Channing Frothingham on "Osteopathy, Chiropractic and the Profession of Medicine," which appeared in *The Atlantic Monthly* for July, 1922.

Many states which have not actually legalized the chiropractor find themselves overrun with that cult, with little hope of an early riddance. The chiropractor through his one thorough accomplishment, advertising, is a liberal purchaser of newspaper space, and with it invites the world to try his new theory of disease, claiming that he uses neither drugs nor surgery because he does not need them. But his main appeal is the old, old cry of persecution.

As a matter of fact, the chiropractor does not always confine himself to "spinal adjustments." Recently a physician in Alabama described an occasion when he was called to see a woman with a Bartholin's abscess for which a chiropractor had prescribed the application of tincture of iodin followed by a flaxseed poultice!

It merely goes to show that the members of all cults sooner or later come to realize the fallacy of basing the etiology of all ills upon a single theory. For example, the homeopaths who were once insistant upon minute doses and *similia similibus* have, to a large extent, in actual practice adopted regular therapeutics and are now homeopaths only in name. And it is not unlikely that a very few generations hence will find that cult without followers due to its gradual absorption by the medical profession. This change has come about partially from a realization of the inadequacy of an inflexible theory, but to an equal extent because of the requirement of many state boards that all cults must pass the same examination as regular physicians.

If chiropraxis or chiropractice (generally, but erroneously, styled "chiropractic") be made to conform to the same state board laws, eventually we may expect to find the chiropractor prescribing regular drugs in regular doses and even engaging in surgery, just as the homeopath long has done and the osteopath is even now attempting.

Of course, at the present time the chiropractor receives no scientific training to enable him to stand a regular state board examination. Last week an instance was reported of an athletic young man who strolled into a doctor's office bearing the following opinion of his case written by a chiropractor:

> "To Whom it may concern:
> "This is to certify that — — — — — — has injured his spine to such an extent as will effect his general health by falling from a scaffold September 5 while working for — — — — — — — — — — —.
> "Injuries are as follows: 3rd dorsal subluxated left. 8th dorsal and 9th dorsal badly rotated Posterior and left. 2nd Lumbar Rotated right.
> "Also clavicle is misplaced where it articulates with sternum.
> "— — —— — — — — D. C."

The above inclines one to paraphrase the words of the man who said that he wished he felt as cocksure about any one thing as Lord Macaulay felt about everything. A physical examination followed by skiagrams disclosed that the husky patient referred to had merely sustained a contusion of the front of his chest. He was entirely recovered in a week's time.

"The Palmer School of Chiropractic," at Davenport, Iowa, has one of the largest printing establishments in America. That institution is carrying on a well-organized

propaganda for its thousands of annual graduates.

This movement of chiropraxis can be combated only by an earnest effort on the part of physicians to explain the true status of things to their state legislators and to insist that the chiropractors be made to stand the same examinations in the pathology, symptomatology and diagnosis of disease that all others are required to take who attempt to heal the sick.

The Chattanooga Meeting

CHATTANOOGA—WHERE WE MEET*

For many reasons Chattanooga is one of the best convention cities in the Nation. Primary among these reasons, perhaps, is the fact that there are so many points of interest in easy reach from the business district. Almost every city of any size has a fairly good supply of hotels and can be reached without undue trouble by railroad. But what cities besides Chattanooga have scenic and historic attractions that can be easily and cheaply visited during spare hours by convention people, enough to keep them interested for several days and all the time giving them information as well as inspiration?

What cities are there that have a beautiful hill inside the corporate limits nearly three hundred feet higher than the business district, from which can be studied the whole city and surrounding country so as to become orientated before visiting the individual places? Such is Cameron Hill in Chattanooga.

What other city has a vast natural observatory from which a whole military campaign comprising several battles can be studied, the eye following the course of each maneuver from start to finish? Such is Lookout Mountain, and some thoroughly traveled men say there is no other eminence in the world from which the entire terrain of a great military struggle can be seen with the naked eye. The battles around Chattanooga were exceedingly important. Close students of the Civil War history have reached the conclusion that the battle of Chickamauga was the real turning point of the great struggle instead of Gettysburg.

How many cities have a great battlefield at the very portal, taken over by a national government in memory of the events which transpired there, preserved, improved, marked and adorned with beautiful monuments, threaded with splendid driveways so that its 5500 acres may be thoroughly and understandingly inspected? Such is the Chickamauga-Chattanooga National Military Park, its gently rolling area, wooded slopes and open fields every one made sacred by the memories of the struggle between the blue and gray in 1863. Thousands upon thousands of tourists and convention visitors every year make this their

*From the Sub-Committee on Publicity of the General Committee from Chattanooga profession.

Looking toward Chattanooga from Lookout Mountain, showing Moccasin Bend of Tennessee River and the City of Chattanooga.

Mecca, along with Lookout Mountain, Missionary Ridge, and Signal Mountain.

What other cities have a ridge extending along one side for miles, a splendid driveway along which affords charming views in both directions? To the west the city is embraced by a winding river and mountains in the near view. To the east a rolling country with mountains in the distance. Such is Missionary Ridge at Chattanooga, made memorable by the struggle in which the assaulting blue lines overcame the gallant gray lines and wrested the city from their siege. Beautiful homes occupy the spaces where Bragg's men camped and fought. Elaborate monuments and detailed markers tell the story of the battle. Automobiles and electric cars climb the slope once torn by artillery fire.

What other city in America is there that has two mountains rising more than two thousand feet above the sea level and both within less than an hour's ride of one another? Signal Mountain is the other height (Lookout having been already mentioned) that puts Chattanooga in a class by herself in that respect. Until recent years only horsemen and hikers penetrated to the overhanging rock where signal fires burned at night and flags wigwagged their messages by day during the Civil War. But now Signal Mountain is one of the most famed resorts in the South, with a large modern hotel, many handsome homes, and abundance of outdoor sports.

With this brief preview of what one finds at Chattanooga, let us consider how to reach it. Chattanooga is practically at the junction of three states—Tennessee, Georgia and Alabama—and is one of the most important railroad centers in the whole Southeast. Rails in every direction make it accessible to every part of the country; and some of the best through trains pass that way, including the Royal Palm, Dixie Flyer, and the Washington-Memphis Special. Nine divisions of five railroad systems give quick routes to all points, so that Chattanooga is not more than a night's ride from every important city in the Southeast except those in the extreme South, and it is as favorably situated with regard to some in the middle section. The approximate railroad time from some of the larger cities is as follows: Cincinnati, 9 hours; Memphis, 10 hours; Nashville, 4 hours; Knoxville, 3 hours; Raleigh, 23 hours; Columbia, S. C., 13 hours; Augusta, Ga., 10 hours; Macon, 6 hours; Savannah, 14 hours; Jacksonville, 12 hours; Atlanta, 3 hours; Montgomery, 7 hours; Birmingham, 4 hours; New Orleans, 15 hours; and Little Rock, 14 hours.

Chattanooga is well equipped with hotels. In May, 1913, the United Confederate Veterans met there; in September of the same year, the Grand Army of the Republic; last year, the Dramatic Order of Knights of Khorassan, the Southern Baptist Convention, and the Confederate Veterans. The three big meetings in 1921 had, respectively, about 10,000, 6,000 and 25,000 people in attendance from outside Chattanooga. This simply means that Chattanoogans know from long practice how to take care of large conventions.

The hotels, section meeting places and the Billy Sunday Tabernacle, the Convention Headquarters, are in a circumscribed area down town, not more than three to ten minutes' walk from any one to the other.

Chattanooga, "The Dynamo of Dixie," extends to all physicians a most cordial invitation to go and partake of its hospitality.

GOLF AT CHATTANOOGA

The golf tournament at the Hot Springs meeting of the Southern Medical Association last year proved to be such an enjoyable feature that the Entertainment Committee of the Chattanooga Convention decided to make it one of the attractions for this year. The tournament will be played over the links of the Chattanooga Golf and Country Club, one of the prettiest courses in the South. Located on the banks of the Tennessee River only about a mile and a half north of the City, the course can be reached quickly by motor car, and there is also a regular trolley service between the City and the links. The location and setting of the course make it of unsurpassing beauty and really one of the show places of the vicinity.

The tournament will be conducted in a similar manner to the one held last year at Hot Springs. Those entering the tournament may play their eighteen holes at any time during the convention which might prove most convenient.

Two prizes will be offered by the Golf Committee: one for the lowest medal score and another for the best handicap score. It is requested that every one anticipating entering the tournament bring with him his handicap. Statement of the handicap should be properly signed by the professional in charge of entrant's club.

After playing the course each player will turn in his card and the Committee will announce the winners on the closing day of the meeting.

GOLF! GOLF!! GOLF!!!

MEDAL CHAMPIONSHIP OF THE SOUTH

To be held at Chattanooga, Tenn., during the Southern Medical Association's meeting in November.

A. Championship of the South: 18 holes low medal score.

B. Handicap Championship: All players are requested to obtain their handicaps from home clubs and present them with par score for home course. Play for handicap championship will be at the same time as the championship round.

Entries are requested at the earliest moment.

E. H. Adkins, M.D., *Chairman*,
Volunteer Bldg., Chattanooga, Tenn.

Book Reviews

A Text-Book of Gynecology, By James Young, D.S.O., M.D., F.R.C.S. (Edin.) Ass't Physician, Royal Maternity Hospital; Lecturer in Clinical Gynecology and Clinical Obstetrics, Edinburgh University; Late University Clinical Tutor in Surgery; Gynecologist, Provident Dispensary, Edinburgh; Examiner, Central Midwives Board for Scotland, etc. Containing 334 pages and 183 illustrations. New York: The Macmillan Co. London: A. & C. Black, Ltd., 1921.

A wide field is covered rapidly, with due proportion by this little book. Starting with a chapter upon anatomy and physiology of the female genital organs, he describes the examination of the gynecological patient, her history, symptoms and common abnormalities such as uterine displacements, infections, extra-uterine pregnancy, new growths, and atresias. He closes with a chapter upon operative gynecology. It is a very good book for the beginner in gynecology.

Southern Medical News

MEETING OF MEDICAL DIRECTORS OF SOUTHERN LIFE INSURANCE COMPANIES

The Medical Directors of all life insurance companies in the South have been urged to attend the Southern Medical Association meeting at Chattanooga, November 13-16, and during that meeting to have a social evening dinner in order to get better acquainted with each other. This dinner has been scheduled for Tuesday night, November 14, at the Patton Hotel. Dr. J. B. Steele, Medical Director, Volunteer State Life Insurance Company, and the General Chairman of the Committee on Arrangements for the Chattanooga meeting, has issued a call for this dinner meeting and is desirous that the Medical Directors and Assistant Medical Directors of all Southern companies be in attendance. It is expected that this social evening dinner will be an annual event in connection with the Southern Medical Association's meetings in the future.

SOUTHERN ASSOCIATION OF ANESTHETISTS

Plans for the organization meeting of the Southern Association of Anesthetists are maturing satisfactorily. The sessions will be held at the Read House, Chattanooga, Tennessee, November 14 and 15, with an organization dinner the evening of the 14th.

The program includes the following papers: President's Address, Dr. Ansel M. Caine, New Orleans, La.; "Synergistic Anesthesia," Dr. F. D. Smythe, Memphis, Tenn.; "Hypotension in Relation to Surgical Conditions and Operative Risks," Dr. Stewart R. Roberts, Atlanta, Ga.; "The Endocrines in Surgical Shock," Dr. Nettie Klein, Texarkana, Tex.; a lantern slide demonstration of the "Safety First" campaign of the Associated Anesthetists, including the simple and practical breath-holding test and other phases of safety and pre-determination of the surgical and anesthesia risk by Dr. F. H. McMechan, Avon Lake, Ohio. A symposium on "Insufflation Anesthesia and Anesthesia Technic for Oral and Dental Surgery" is also in preparation and will be contributed to by Dr. George L. Seeman, Nashville, Dr. P. N. Ogle, Knoxville, and others. Other papers of equal excellence and practical value will be presented, including the latest opinions on nitrous oxid in obstetrics and the new ethers and mixtures. Dr. W. Hamilton Long, 1911 Duker Avenue, Louisville, Ky., is organization Secretary.

ALABAMA

Bids have been opened for the United States Public Health Service Hospital, Tuskegee. An appropriation of $2,500,000 has been made. There will be 230 beds for tuberculosis cases, and 270 beds for nervous and mental cases.

The State Board of Health has adopted regulations defining the sanitary requirements, facilities and conditions under which circuses, street fairs, county agricultural fairs and similar exhibitions may be held in the State. Permanent exhibition grounds will be provided, with separate drinking fountains, plainly designated for each race. Persons suffering from any communicable disease are prohibited from handling or serving food or beverages on any exhibition grounds.

Contracts have been awarded for the erection of the fifty-five bed hospital known as the Birmingham General Hospital, to be operated by railway brotherhoods.

Dr. W. H. Abernethy, Florence, has resigned as County Health Officer of Lauderdale County. He will succeed Dr. Douglas Cannon as Health Officer for Pike County, and will reside in Troy.

Dr. Douglas Cannon, Troy, has been appointed State Director of County Health Work.

Deaths

Dr. Samuel Henry Hill, Carrollton, aged 75, died recently from appendicitis.

Dr. Louis Dominick Robinson, Montgomery, aged 48, died July 30 at the Washington County Hospital, Hagerstown, Md., following an operation.

Dr. Philmer Bruce Green, Fort Payne, aged 70, died July 10 from chronic nephritis.

Dr. Solomon Franklin Jowers, Equality, died July 15 from paresis.

ARKANSAS

A new three-story nurses' home for St. Vincent's Infirmary, Little Rock, is under construction. The home will cost approximately $100,000 and will accommodate eighty nurses.

Three hundred women patients were successfully removed from a large ward building at the State Hospital for Nervous Diseases, Little Rock, when the hospital was destroyed by fire August 1.

Dr. George S. Brown and Dr. Isaac N. McCollum, Conway, have been appointed Chairman and City Health Officer, respectively, on the City Board of Health.

Deaths

Dr. William H. Bailey, Cabot, aged 51, died July 23 following a long illness.

Dr. Charles Merchant Roberts, Hot Springs, aged 55, died August 4.

Dr. William M. Solomon, North Little Rock, aged 50, died July 30.

Dr. Arthur Hickman Sykes, Junction City, aged 61, died August 11.

Dr. James M. Nix, Adona, aged 67, died June 30 from paresis.

DISTRICT OF COLUMBIA

Dr. Robert W. Shufeldt, Washington, Major, M.C., U. S. Army, retired, has accepted the position of lecturer on art anatomy and zoology on the faculty of the Research University.

A bill in the Senate has been introduced by Senator Calder, New York, providing home care for dependent children of the District of Columbia.

Howard University, Washington, is making a drive to raise $250,000 for the medical school in order to meet the conditional offer of the same sum from the General Education Board.

Deaths

Dr. Samuel N. Quillin, Washington, aged 53, died at the Sibley Memorial Hospital May 19 from diabetes.

FLORIDA

There are many cases of dengue fever in Tampa, as reported by the City Health Officer. One hundred and twelve dengue patients have been reported since the count began.

Plans are being made for the erection of a county hospital for Polk County.

Dr. Ernest B. Milam, Jacksonville, will do the laboratory work for the Florida subdistrict office of the U. S. Veterans' Bureau.

It was recently announced that the fight against venereal disease being conducted by the State Board of Health is proving very successful. They have twelve clinics in the State for the free treatment of indigent cases and for a graduated fee in cases of those not able to pay a full fee. Four of the clinics are conducted by physicians employed by the Standard Lumber Company.

Dr. Jay A. Powell, West Palm Beach, has been appointed County Physician and Superintendent of the County Poor Farm, succeeding Dr. Albert H. King, deceased.

The first unit of the new tuberculosis hospital, Jacksonville, will soon be erected at a cost of $137,000. It will be a three-story fire-proof building. Each wing will contain twenty-five beds.

Dr. John Keely, Miami, and Miss May Bodine Walker, Louisville, Ga., were married in New York recently.

Deaths

Dr. Alpheus Henley, Melbourne, aged 88, died July 11.

Dr. J. Louis Horsey, Fernandina, aged 65, died July 13.

Dr. Julius Thomas Holden, Marianna, aged 88, died August 1.

Dr. Enrique Alberto Rodes, Tampa, aged 29, died July 11 in Havana, Cuba, following a long illness.

GEORGIA

A resolution has been presented to the House of Representatives of Georgia to launch a campaign for $12,000 to place statues of Alexander H. Stephens and Dr. Crawford W. Long in the Hall of Fame, Washington, D. C. The resolution provides for the appointment of three members of the House and two of the Senate to act with a committee of citizens to raise funds for the memorial.

The Wesley Memorial Hospital, erected on the campus of Emory University School of Medicine, Atlanta, was opened in September. The first unit cost $1,250,000; the total cost of the institution will be more than $3,000,000. The Lucy Elizabeth Candler Memorial will be connected with the new hospital and will be the maternity pavilion. This was erected with funds donated by the children of the late Mrs. Asa G. Candler. The first unit will have a bed capacity of 235, and the total capacity, when completed, will be 500 beds.

The Lenwood Hospital, a Government institution, being erected at a cost of $400,000, will soon be completed. The seven buildings under construction are of stucco and reinforced concrete. Patients will occupy five of the buildings, in addition to the main building. The sixth building will be used as a dining room and kitchen and the seventh as a power house.

Dr. Jarrett W. Palmer, Ailey, has been reappointed a member of the State Board of Medical Examiners for a term of four years.

The Senate has adopted a resolution creating a state agency to cooperate with the Federal Department of Child Hygiene for the expenditure of $19,530 apportioned the State under the provisions of the Sheppard-Towner Maternity Bill.

Dr. Frederick Morris, Atlanta, has been appointed a member of the City Board of Health.

Dr. Victor H. Bassett, after serving fourteen years as Director of the Municipal Laboratory, Savannah, resigned, effective August 31 or as soon as inventory can be made and City property turned over. Dr. Bassett states his resignation is on account of political interference.

Deaths

Dr. Jesse C. Asbury, Greensboro, aged 57, died July 3.

Dr. John I. Lane, Brooklet, aged 73, died July 10.

Dr. Charles E. Whitfield, Woodstock, died recently from chronic interstitial nephritis.

Dr. Lee Benjamin Clarke, Atlanta, aged 54, died August 24 from paresis.

Dr. Augustus Milton Anderson, Atlanta, died suddenly August 9 from acute cardiac failure.

KENTUCKY

An early issue of the Kentucky State Medical Journal will be published as a memorial to the life and work of the late Dr. Joseph N. McCormack, the publication of which will be under the direction of his life-long friend and associate, Dr. Lewis S. McMurtry, President of the State Board of Health.

The new hospital being erected at Whitesburg is almost completed.

Dr. Laura Keisker, Louisville, has been appointed school physician for the Southwestern District. Dr. Keisker succeeds Dr. Anna Veech, who resigned.

A new hospital at a cost of $35,000 will be erected at Maysville.

At a recent meeting of the National Committee for Mental Hygiene, held in Louisville, plans were made for conducting the mental survey of the State, authorized by the last General Assembly, the purpose of which is to determine the deficiencies of prisoners in the State penal institutions and the mentality of the school children, so that steps may be taken to reduce the number of criminals and defectives in the next generation. Dr. Frank O'Brien, Secretary of the Louisville Society for Mental Hygiene, was elected Executive Secretary of the Advisory Committee. Drs. A. T. McCormack, Louisville, and C. P. Sprague, Lexington, are other members of the Committee.

Plans are being made for the erection of a new tuberculosis hospital at Waverly Hills.

The Harrison Memorial Hospital, Cynthiana, was dedicated on July 4.

Dr. Amzi Weaver has been appointed Township Physician for New Albany Township.

Dr. Grover C. Daniel, Fallsburg, and Miss Elma L. Gahler, Rochester, Minn., were married July 11.

Deaths

Dr. T. A. Brady, Cuba, aged 78, died July 22 from heart disease.

Dr. Martin Eugene Thomas, Paducah, aged 48, was found dead on the street August 20.

Dr. R. W. Hazelwood, Friendship, aged 84, died August 1.

LOUISIANA

The Home Mission Board of the Southern Baptist Association will build a general and research hospital in New Orleans to cost approximately $2,000,000.

St. Rita Surgical Infirmary, New Orleans, is improving its facilities. The twin building next to the Infirmary has been purchased and this now gives the institution a total capacity of fifty beds, with two operating rooms. The Sisters of Mercy have charge of the institution.

The Charity Hospital, New Orleans, has requested a bond issue of $300,000, which Governor Parker vetoed as unconstitutional after the bill had passed the Senate and the House. The money is needed for an additional building for internes and for nurses. The internes' home was erected thirty-three years ago to house eighteen internes. Thirty are now crowded in, and others seek accommodations elsewhere. The nurses' home was erected seventeen years ago to accommodate 102 nurses. The minimum requirement now is space for 200 nurses.

Dr. Charles H. Voss, New Orleans, will soon sail for China as a medical missionary under the auspices of the Foreign Mission Board of the Southern Presbyterian Church. He will be Surgeon-in-Charge of the Elizabeth Blake Hospital at Soochow.

Dr. Sanders L. Christian, U. S. Public Health Service, Shreveport, has sailed for Antwerp, Belgium, to aid the United States Council in promoting better health conditions in that country.

There are many cases of smallpox in oil regions of the State. The State Health Officer, Dr. Dowling, has issued warnings that all persons whose business takes them to these regions should be vaccinated. One hundred and fourteen cases occurred at Haynesville, as stated in the report of communicable disease for the week ending July 22.

Dr. G. W. Stephens, formerly of Shreveport, recently returned to the United States from Great Britain. While in Manila, P. I., Dr. Stephens joined the Medical Corps of the British Army as a Captain at Hongkong, in 1914. Since then he has served with the R.A.M.C. at Gallipoli, with Allenby in Palestine, and in Ireland. He has been mustered out and will return to his home.

Deaths

Dr. Latzi Szabary, New Orleans, aged 68, died July 23 from heart disease.

Dr. Joseph Johnson Holt, New Orleans, aged 82, died August 23.

MARYLAND

Plans to reopen the U. S. Marine Hospital, Baltimore, with enlarged facilities, are being made, following a recent appropriation of $20,000 by Congress. The Hospital will be in charge of Major M. H. Foster and will be open to patients from the United States Coast Guard, Naval Service and Merchant Marine, and to disabled Federal employees and foreign seamen. Improvments will consist of new heating apparatus and mess rooms and enlargement of the hospital capacity to about 230 beds.

The contract has been awarded for the Municipal Hospital for Communicable Diseases in Baltimore, to be located at Montebello, at a bid of $658,600. Pavilions A and C will be built later. This is to avoid running the cost of the Hospital up to $1,000,000, or $300,000 in excess of the loan. The building will be of light-colored brick with green tile roof.

In the faculty of hygiene and public health of Johns Hopkins University, Baltimore, Dr. William W. Ford has been appointed Professor of Bacteriology, and Dr. Carroll G. Bull, Professor of Immunology. In the faculty of medicine, Dr. Warfield T. Longcope has been made Professor of Medicine; Drs. Harold L. Amoss, Wm. S. McCann and Arthur L. Bloomfield, Associate Professors of Medicine; Dr. Robert S. Cunningham, Associate Professor of Anatomy;

Drs. Benjamin Kramer and Wilburt C. Davison, Associate Professors of Pediatrics; Dr. Esther L. Richards, Associate Professor of Psychiatry; Drs. Leslie B. Hohman and Phyllis G. Richter, Associates in Psychiatry; Dr. Albert Keidel, Associate Professor of Clinical Medicine; Drs. Ernest H. Gaither and J. Earle Moore, Associates in Clinical Medicine; Dr. Emil Novak, Associate in Clinical Gynecology; Dr. Wilder G. Penfield, Associate in Neurology.

Plans are being made to form an alumni association of the new University of Maryland, to include graduates of the Baltimore Medical College, College of Physicians and Surgeons, and the University of Maryland Medical School, now merged into the University of Maryland. The following are in charge of the alumni association: Dr. G. Milton Linthicum, President; Drs. Jacob Guy Steele and Charles Bagley, Jr., Vice-Presidents, and Dr. William S. Love, Recording Secretary.

Dr. Joseph Pokorny and Miss Carrie Wells, both of Baltimore, were married July 23.

Deaths

Dr. Charles Albert, Rockville, aged 69, died July 23 at the Montgomery County General Hospital, Olney, from heart disease.

MISSISSIPPI

The Jackson County Health Unit will be organized this month. Dr. May F. Jones, Sanatorium, has been sent to Pascagoula by the State Board of Health to organize the unit.

Work has been started on the new Martha Ross Hospital at the Mississippi Woman's College at Hattiesburg. Dr. J. L. Johnson is President of the Hospital.

Dr. Henry L. Cook, Jackson, has been appointed full-time Health Officer of Hinds County.

The United States Government will establish a $1,000,000 hospital on the property of the Mississippi Centennial Exposition Company, Gulfport.

The Mississippi Association for the Blind plans to make a survey to determine the number of blind persons in the State and the cause of blindness in each case. A social worker will be provided to make interviews and ascertain individual needs of the blind.

At a recent meeting of the Harrison County Medical Society, Dr. W. A. Dearman presented in a very graceful and effective manner the long and useful career of Dr. H. M. Folkes, Biloxi. He mentioned specially his work in regard to the promotion of public health on the Mississippi coast. At the conclusion of the address Dr. Dearman presented Dr. Folkes with a certificate of honorary membership of the Society.

The Matty Hersee Hospital, now in course of construction at Meridian, will be known as the East Mississippi Charity Hospital. The building will cost $78,000 and will be of tile and brick and will have accommodations for 200 patients.

MISSOURI

The Wintersteiner Collection of 13,000 microscopic preparations of pathologic changes in the eye has been acquired by the St. Louis University. The collection is said to be the most complete in Europe and will be utilized for graduate instruction in ophthalmology.

The Pettis County Medical Society gave a farewell dinner in honor of Dr. Everett A. Wood, Sedalia, July 6. Dr. Wood practiced in Sedalia for twenty-seven years and was the founder of the former Maywood Hospital. He has retired from practice and will make his home in Hemet, Calif.

Dr. Charles E. Salyer and Mrs. Hallie Gerald O'Haver, both of Hannibal, were married recently.

Deaths

Dr. James W. McClure, Sedalia, aged 79, died July 25.

Dr. Herman J. Morganstein, Weingarten, aged 63, died June 10 from cerebral hemorrhage.

Dr. Robert H. Lillemann, St. Louis, aged 52, died July 17 at Barnes Hospital.

Dr. William Shelley Hutton, Fornfelt, aged 43, was drowned July 3 in the Mississippi River at Gray's Point, with his sixteen-year-old son, when trying to save him from drowning.

Dr. William Walter Wertenberger, St. Joseph, aged 51, died August 1 at the Noyes Memorial Hospital from wounds inflicted when struck by a bullet aimed at police officers by a bandit.

Dr. Joseph M. Powers, Warrensburg, aged 73, died recently from chronic interstitial nephritis.

(Continued on page 38)

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(Continued from page 864)

Dr. James F. Jett, Linn, aged 66, died June 11 at St. Louis from pulmonary embolism.

Dr. Adolf L. Korn, Joplin, aged 41, died August 16.

Dr. Louis W. Ehrlich, St. Louis, aged 57, died June 18 from hydronephrosis.

Dr. Patrick Henry Griffin, St. Louis, aged 62, died recently.

NORTH CAROLINA

The Lenoir Clinic, Kinston, was opened in August. Ten rooms will be used for laboratory, consultation, administration and emergency hospital purposes. A number of whole and part-time physicians and nurses will be employed, together with sanitary inspectors, etc. The negro citizens have donated an automobile for the use of a nurse to work among them. Dr. William F. Hargrove donated an operating table. Other hospital furnishings have been given by residents of Kinston.

It is understood that construction work on the Clarence Barker Memorial Hospital and Dispensary, Biltmore, will start early this fall. The first group of new buildings will be erected at a cost of $350,000.

A health campaign has been conducted for several weeks in Lenoir County. Physicians and dentists will continue to deliver lectures at various points every Thursday night through September.

Dr. Hunter McGuire Sweaney, Durham, has been appointed City and County Physician.

Contracts have been let for the Shelby Hospital. The cost will be $52,000, and it will have a thirty-four-bed capacity.

Dr. Alexander C. Bulla, Winston-Salem, in the midst of an inoculation campaign against typhoid fever conducted by the State Board of Health, himself contracted the fever.

Dr. John W. Long, Greensboro, President of the State Medical Association, has appointed a committee of thirty members of the Society to take action as they may see fit on the proposed plans for a four-year medical school to be established by the University of North Carolina. Dr. I. W. Faison, Charlotte, has been named Chairman of the Committee.

(Continued on page 40)

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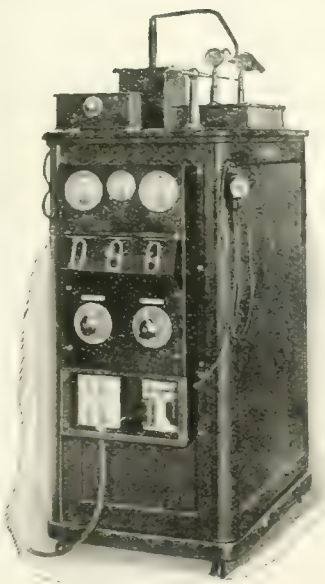

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(Continued from page 38)

Dr. John C. Dye, Statesville, has sailed for Honolulu, and will have charge of the eye department of the Tripler General Hospital.

Deaths

Dr. Archibald A. Campbell, Statesville, aged 66, died suddenly from heart disease July 17.

Dr. Francis Wade Hughes, New Bern, aged 65, died June 28 at the Union Protestant Hospital, Baltimore.

OKLAHOMA

Dr. John C. Hubbard, who for several years served in the Federal health department as quarantine physician at Cristobal, Canal Zone, has returned to the United States and will locate at Oklahoma City.

Dr. Williamson Haley Rogers, Wilson, and Miss Juanita Tidmore, Abilene, Tex., were married June 19.

Deaths

Dr. Bascom James Vance, Checotah, aged 69, died July 27 in a hospital at Muskogee from pneumonia.

Dr. Thomas E. Ashinhurst, Waurika, aged 45, died July 13 from chronic nephritis.

Dr. Lyman T. Strother, Nowata, aged 82, died July 19 following a long illness.

SOUTH CAROLINA

Arrangements have been completed with the U. S. Public Health Service, the State Board of Health and the Seaboard Air Line Railway for an extensive survey by a sanitary engineer of the lands connected with that railroad in the State. Beginning at Andrews, the malaria survey will be continued to the Savannah River line, and then to Jacksonville, Fla.

Under the auspices of the City Hospital, Greenville, and the Greenville County Tuberculosis Association, a tuberculosis clinic has been established. An appropriation of $6,000 additional to the charity fund of the hospital was also voted July 17, which brings the total sum for charity work to $12,000.

Drs. Hugh R. and Samuel O. Black, Spartanburg, have leased the Julia Irby Hospital, Laurens, and will reopen it soon.

(Continued on page 42)

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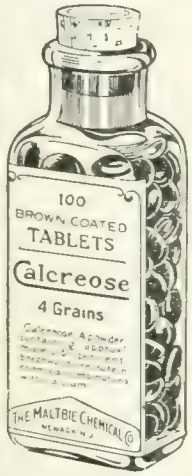

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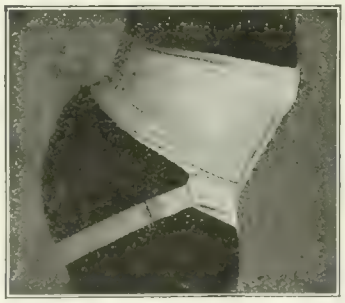

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(Continued from page 40)

The American Bronchoscopic Society has established a scholarship at the Medical College of the State of South Carolina, Charleston, in memory of the late Dr. Henry Lowndes Lynah, a graduate of that institution in 1900. At the last meeting of the Society a resolution was adopted that a scholarship of $100 be voted annually in memory of Henry L. Lynah, one of the founders of the Society, to be applied to a scholarship to be established at the South Carolina Medical College. The Dean of the school will award the scholarship to a deserving student.

The Greater Citadel Hospital will erect a new $60,000 hospital at Charleston.

Dr. Percy Brigham has resigned as Health Commissioner of Orangeburg and has been appointed City Health Commissioner of Florence, succeeding Dr. Clarence C. Craft, resigned.

The contract has been let for an addition to the South Carolina Sanatorium, Columbia.

Dr. J. C. Mitchell, Anderson, City Health Officer, has resigned and has been succeeded by Dr. Theo Burriss.

The Landrum Board of Health was recently organized. Dr. A. R. Walden was elected President.

Dr. Charles H. E. Esdorn has resigned as Chairman of the Board of Health of Waterboro.

The new home for nurses at Columbia Hospital, erected at a cost of $100,000, and known as William Weston Hall, was formally opened July 28. The building is named for Dr. William Weston.

Deaths

Dr. Robert Charles McManus, Lancaster, aged 63, died August 9 from carcinoma of the stomach.

Dr. Pettus Gray Ellesor, Newberry, aged 53, died August 14.

TENNESSEE

Dr. Claude Evans Tubb, formerly of Murfreesboro, has moved to Sparta.

A colored baby clinic was recently held at Clarksville. Of all the children examined, nine averaged 23 per cent underweight, and no children were more than 10 per cent overweight. The nurses of the Montgomery County Health Unit will visit these babies in their homes and efforts will be

(Continued on page 41)

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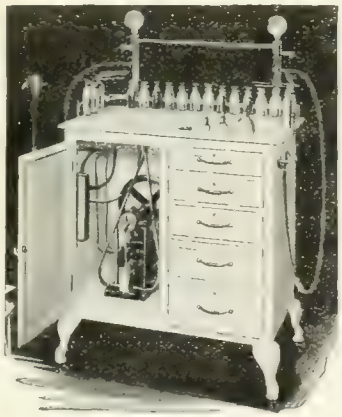

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(Continued from page 42)

made to bring those underweight up to normal. Future clinics will be held to note changes in the general condition of the children.

Deaths

Dr. Samuel W. Hixon, Daisy, aged 62, died July 19 at a hospital in Chattanooga.

Dr. John A. Mason, aged 45, died recently.

Dr. George Washington Piper, Decherd, aged 58, died May 29 from paresis.

Dr. William Jerome Bazemore, Chattanooga, aged 78, died July 31.

Dr. William S. Scott, Dickson, aged 69, died August 22 from paresis.

Dr. Richard Carter Smith, Newport, aged 66, died August 9.

TEXAS

The Frances Ann Lutcher Hospital, Orange, has opened a free medical and dental clinic at that institution. This was made possible by the generosity of Mr. and Mrs. Luther Stark in furnishing the rooms and equipment. A full-time social service worker will be employed. The physicians of the Orange County Medical Society will devote a portion of their time to these clinics.

Dr. Robert H. Looney, Waxahachie, and Dr. William F. Holland, Santa Anna, have been appointed members of the State Board of Health to succeed Dr. Dickson G. Thompson and Dr. M. P. Smartt.

Final plans for the Potter County Hospital to be erected at Amarillo at a cost of $250,000 have been accepted by the County Commissioners.

Dr. Frank W. Hartman, Temple, Chief Pathologist at the Temple Sanatorium, has been appointed Chief Pathologist at the Detroit City Hospital, Detroit.

A new nurses' home will be erected at Dallas for St. Paul's Sanatorium. Accommodations will be made for 150 nurses.

(Continued on page 46)

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I. A side fine adjustment with 34 threads of the screw always engaged instead of but one in other makes.

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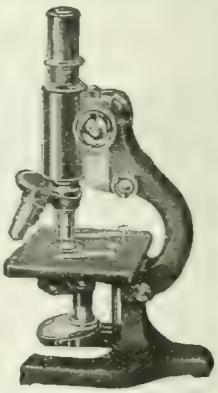

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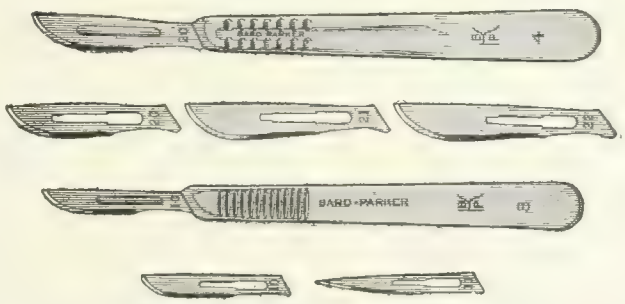

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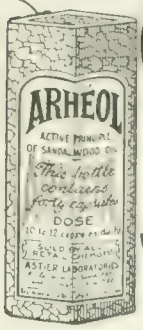

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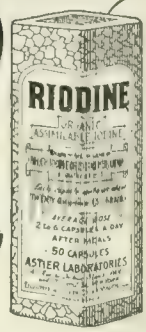

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(Continued from page 44)

Deaths

Dr. Arthur R. Sholars, Orange, aged 47, died June 15.

Dr. Thomas M. Hartsfield, Hillsboro, aged 52, died July 3 in a sanatorium at Waco.

Dr. Rufus B. West, Fort Worth, aged 64, died suddenly August 9 from heart disease.

Dr. Asahel B. Gardner, Greenville, aged 76, died August 5.

Dr. A. L. Parish, Tenaha, aged 50, died June 30.

Dr. J. K. Miles, Conroe, aged 56, died recently.

VIRGINIA

The Piedmont Medical Society has elected the following officers: Dr. W. D. Macon, Charlottesville, President; Drs. F. G. Scott, Jr., Orange, and W. C. Mason, Gordonsville, Vice-Presidents; Dr. Lewis Holladay, Orange, Secretary-Treasurer. The Society plans to enlarge its membership by taking in doctors from additional counties and will have two instead of four meetings annually, the winter meeting to be held in Charlottesville or University, the summer meeting to be held at various places in that section of the State.

Nelson County Medical Society has elected the following officers: Dr. W. M. Tunstall, Lovingston, President; Dr. J. F. Thaxton, Tye River, Secretary-Treasurer, re-elected.

The State Medical Association will meet in Norfolk October 31-November 3.

Dr. William F. Grigg, Richmond, has been appointed a member of the Board of Directors of the Virginia Industrial School for Boys.

Dr. W. O. McCabe, Thaxton, has been elected President of the Bedford County Fair Association.

Dr. Micajah Boland, formerly of the Naval Training Station, Hampton Roads, has been appointed Medical Director of the Gendarmerie d'Haiti, with rank of Colonel. His headquarters will be in Port au Prince, Haiti.

Dr. William A. Harris, Spotsylvania, has been appointed one of the school trustees for Spotsylvania County.

The following have been reappointed members of the State Board of Health: First District, Dr. John W. Daniel, Cape Charles; Fourth District, Dr. Wm. F. Drewry, Petersburg; Eighth District, Dr. William M. Smith, Alexandria.

Dr. R. L. Hundall, Beverlyville, has been elected President

(Continued on page 48)

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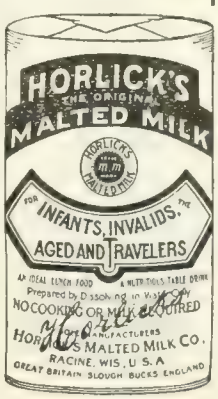
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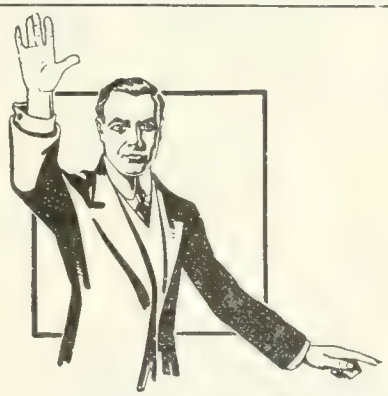

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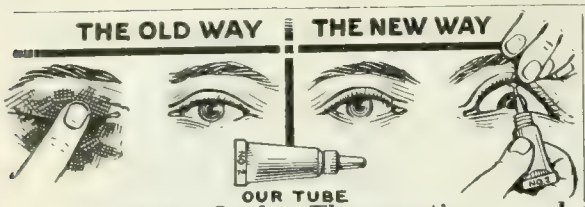

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(Continued from page 46)

of the Northumberland County Farm Bureau. The Bureau was organized with 106 members and is an auxiliary of the Virginia Farm Bureau Federation and the American Farm Bureau Federation.

An amendment was recently made to the city ordinances of Richmond to extend police powers to certain employees of the health department, so as to include nurses connected with the Bureau of Health. Twelve nurses and the chief nurse of the Health Bureau were recently sworn in with police powers.

Two units of the new Marshall Lodge Memorial Hospital, Lynchburg, being built by the Marshall Lodge of Masons, were formally opened the first of July. Construction on the third and fourth units will be started at once.

Dr. W. W. Chaffin has been elected Vice-President of the Rotary Club, Pulaski.

Dr. Charles W. Putney has accepted a position in Norfolk as a Medical Examiner with the Relief and Pension Department of the Norfolk and Western Railway Company.

Dr. R. W. Garnett, Danville, has been re-elected City Health Officer.

Dr. L. E. Fuller, Axton, has been elected a member of the Board of Directors of the Bank of Axton.

Dr. H. M. DeJarnette, Fredericksburg, has been appointed a member from the State-at-large of the Virginia Normal School Board. He has served on the Board for the past four years.

Deaths

Dr. Philip Taylor, Richmond, aged 72, died August 1.

Dr. George Victor Litchfield, Jr., Bristol, aged 45, died suddenly September 4.

WEST VIRGINIA

Fayette and Raleigh County Societies recently held a meeting in Beckley, at which time the alumni of the Medical College of Virginia who were present organized the Alumni Society of the Medical College of Virginia in Southern West Virginia. The following officers were elected: Dr. John E. Cannaday, Charleston, President; Dr. Walter E. Vest, Huntington, Secretary.

Through the Cabell County Medical Society, the Chief of Police of Huntington has requested all Huntington physicians to display on the radiators of their cars the official automobile emblem of the American Medical Association.

Deaths

Dr .George M. Hamilton, Weston, aged 61, died August 20.

Dr. George William Holley, Hinton, aged 54, died August 8 from chronic nephritis.

Dr. James H. Rowsey, Huntington, aged 54, died August 3 from carcinoma of the stomach.

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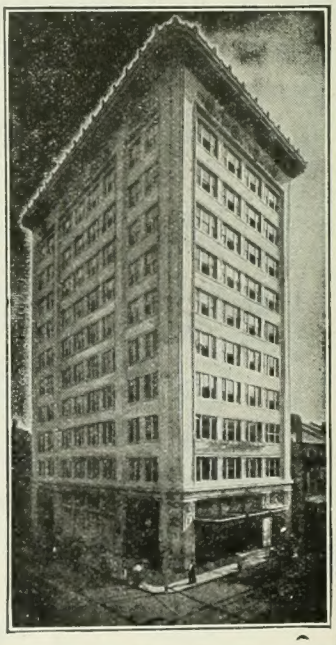

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